



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

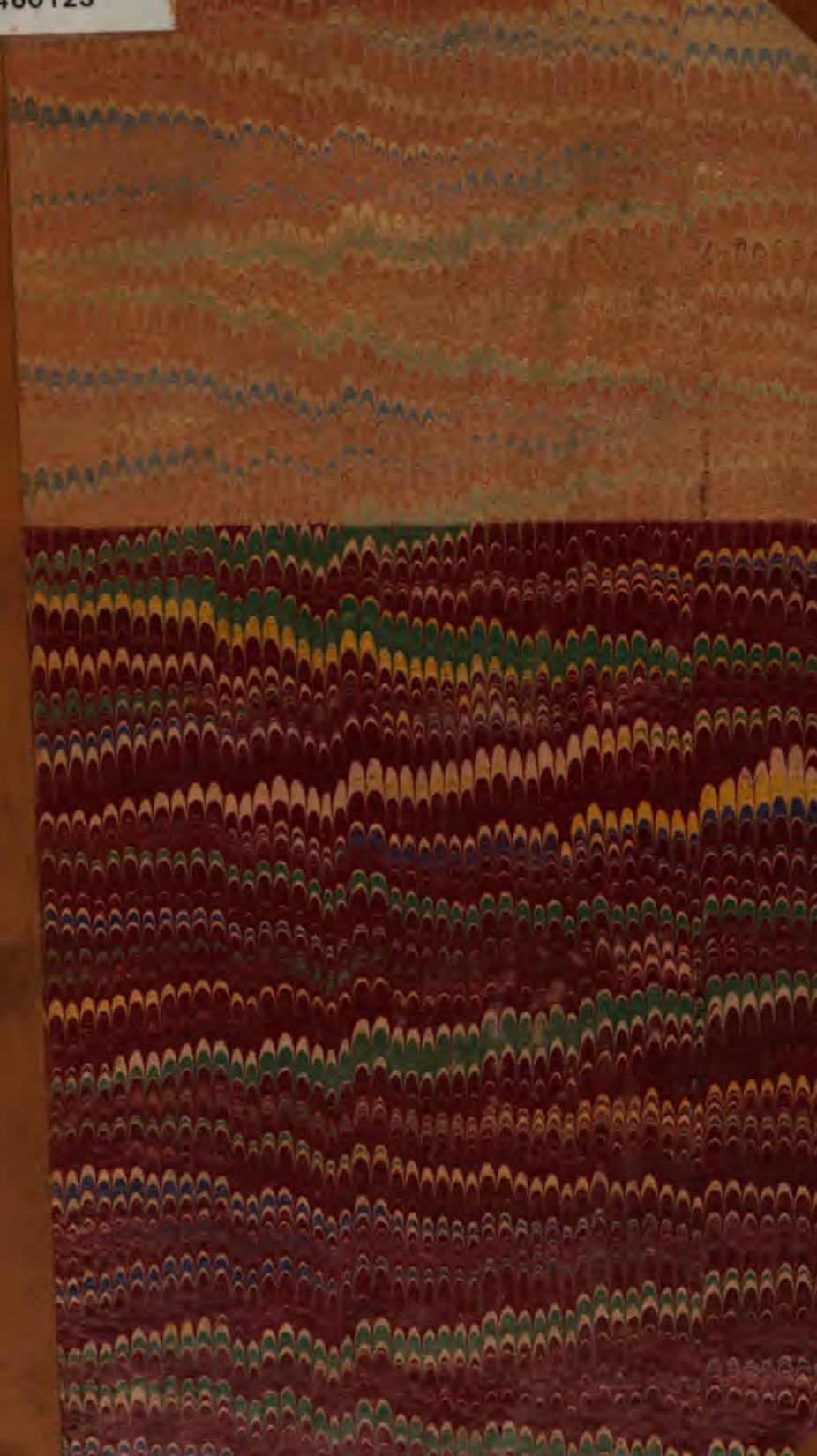
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

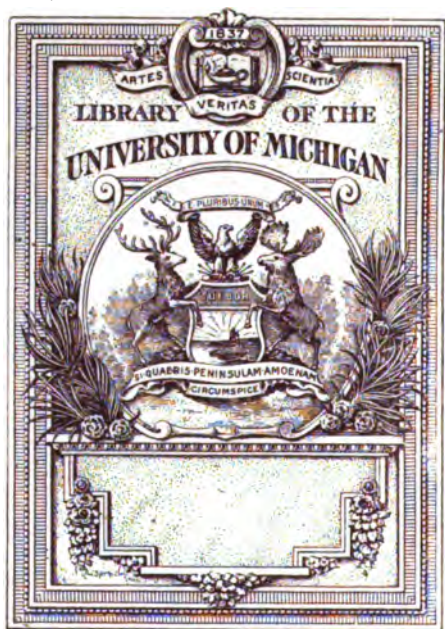
We also ask that you:

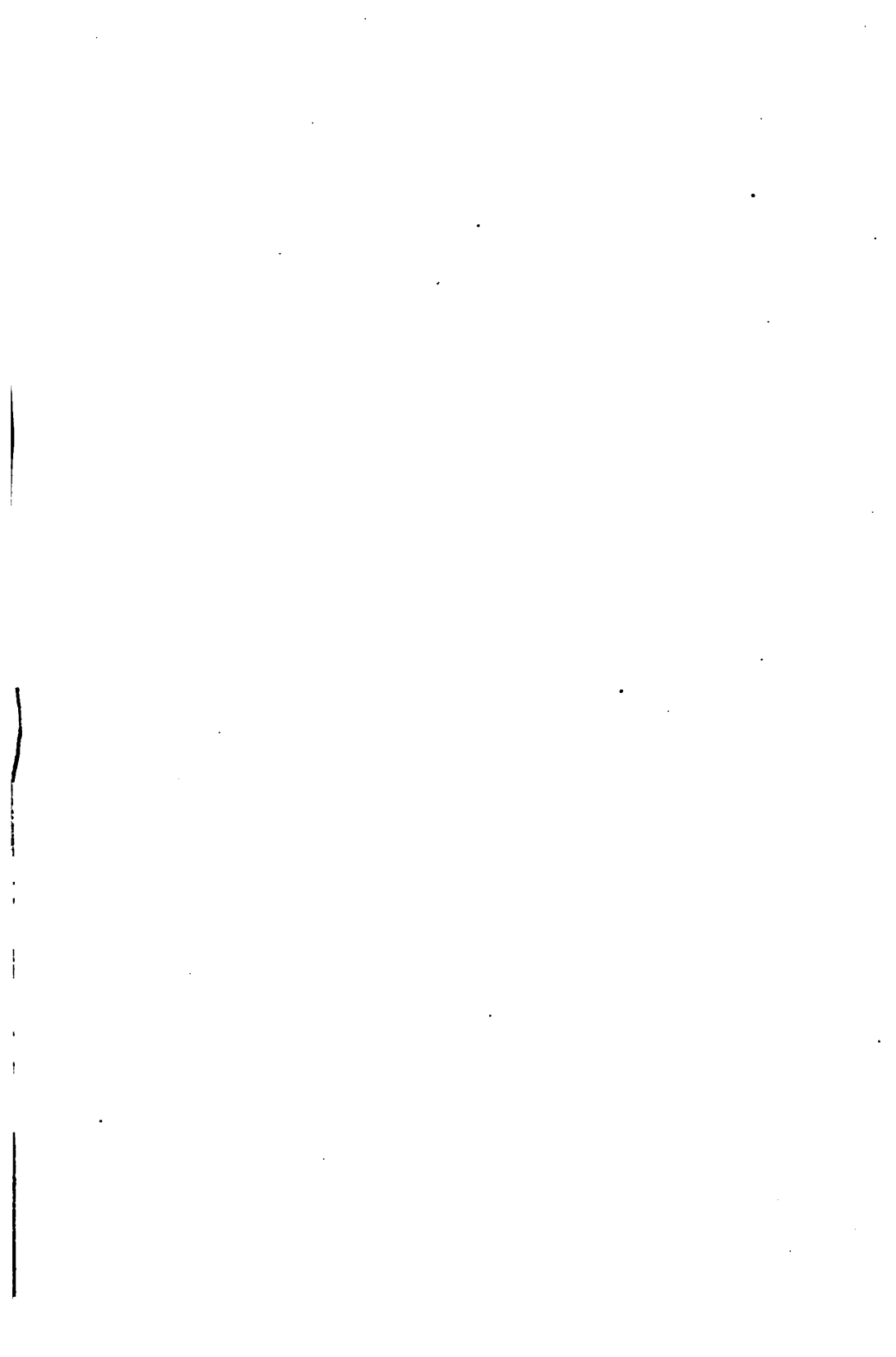
- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>









LEGISLATIVE DOCUMENTS

SUBMITTED TO THE

Twenty-ninth General Assembly

OF THE

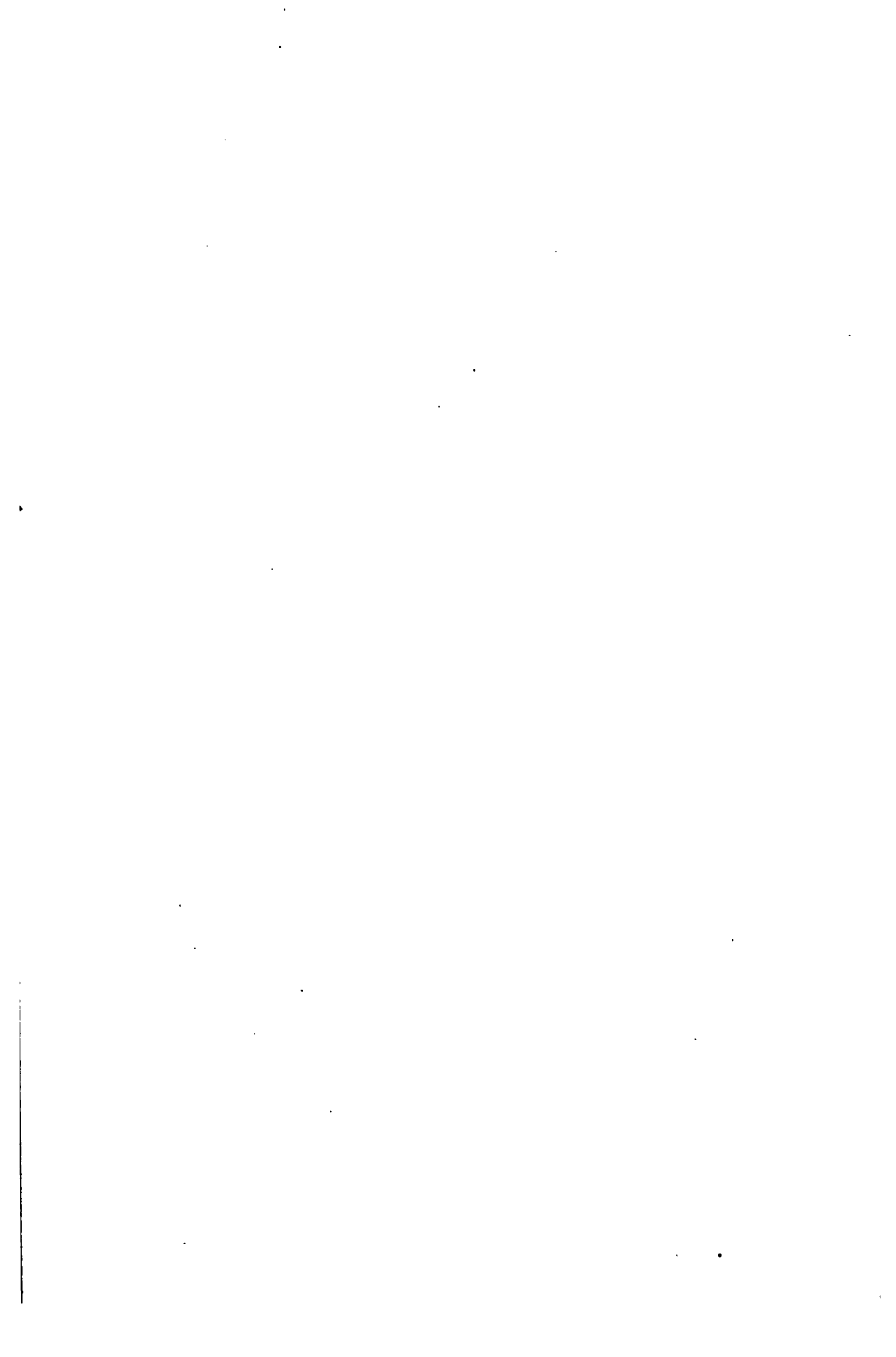
STATE OF IOWA

Which Convened at Des Moines, January 13, 1902.

ALBERT B. CUMMINS;	- - - - -	Governor
JOHN HERRIOTT,	- Lieutenant-Governor and President of the Senate	
W. B. MARTIN,	- - - - -	Secretary of State
FRANK F. MERRIAM,	- - - - -	Auditor of State
G. S. GILBERTSON,	- - - - -	Treasurer of State
RICHARD C. BARRETT,	- Superintendent of Public Instruction	
CHARLES W. MULLEN,	- - - - -	Attorney-General
WILLARD L. EATON,	- - Speaker of the House of Representatives	

VOLUME IV.

DES MOINES
B. MURPHY, STATE PRINTER
1902



VOLUME I.

- No. 1. Message.
 - No. 2. Inaugural.
 - No. 3. Report of Auditor.
 - No. 4. Report of Treasurer.
 - No. 5. Report on Pardons.
 - No. 6. Report of Criminal Convictions.
 - No. 7. Report of Land Department.
 - No. 8. Report of Custodian of Public Buildings.
-

VOLUME II.

- No. 9. Report of Adjutant-General.
 - Report of Railroad Commissioners for 1900.
 - Report of Railroad Commissioners for 1901.
 - Railway Assessment for 1901.
 - Railway Assessment for 1902.
-

VOLUME III.

- No. 10. Report of Attorney-General.
 - No. 11. Report of Librarian.
 - No. 12. Report of Historical Department.
 - No. 13. Report of Historical Society.
 - No. 14. Report of Superintendent of Public Instruction.
 - No. 15. Report of State University.
 - No. 16. Report of State Agricultural College.
-

VOLUME IV.

- No. 17. Report of State Normal School.
- No. 18. Report of Fish Commissioner.
- No. 19. Report of Bureau of Labor Statistics.
- No. 20. Report of Mine Inspectors.
- No. 21. Report of Board of Health.

VOLUME V.

- Report of Board of Control.
No. 22. Report of Pharmacy Commissioners.
No. 23. Report of Veterinary Surgeon.
No. 24. Rules of the Twenty-ninth General Assembly.
No. 25. Report of Board of Dental Examiners.
No. 26. Report of Oil Inspections.
No. 27. Report of Dairy Commissioner for 1900.
No. 28. Report of Dairy Commissioner for 1901.
-

VOLUME VI.

- Insurance Report for 1901. Volume I. Fire.
Insurance Report for 1901. Volume II. Life.
-

VOLUME VII.

- Insurance Report for 1902. Volume I. Fire.
Insurance Report for 1902. Volume II. Life.

THIRTEENTH BIENNIAL REPORT

OF THE

STATE NORMAL SCHOOL

AT

CEDAR FALLS, IOWA.

SCHOOL YEARS 1899-1900 AND 1900-1901.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY.

DES MOINES:
BERNARD MURPHY, STATE PRINTER.
1901.

LETTER OF TRANSMITTAL.

To the Governor of Iowa:

As required by section 2680, Code of 1897, the Board of Trustees of the State Normal School, at Cedar Falls, herewith transmits its report for the biennial period ending June 30, 1901.

A. GRUNDY,
Secretary.

IOWA STATE NORMAL SCHOOL.

STATE BOARD OF CONTROL.

L. G. KINNE, Des Moines.....Term expires 1902
JOHN COWNIE, South Amana.....Term expires 1904
G. S. ROBINSON, Sioux City.....Term expires 1906

BOARD OF TRUSTEES.

RICHARD C. BARRETT, *ex-officio*, Des Moines, Superintendent of Public Instruction.

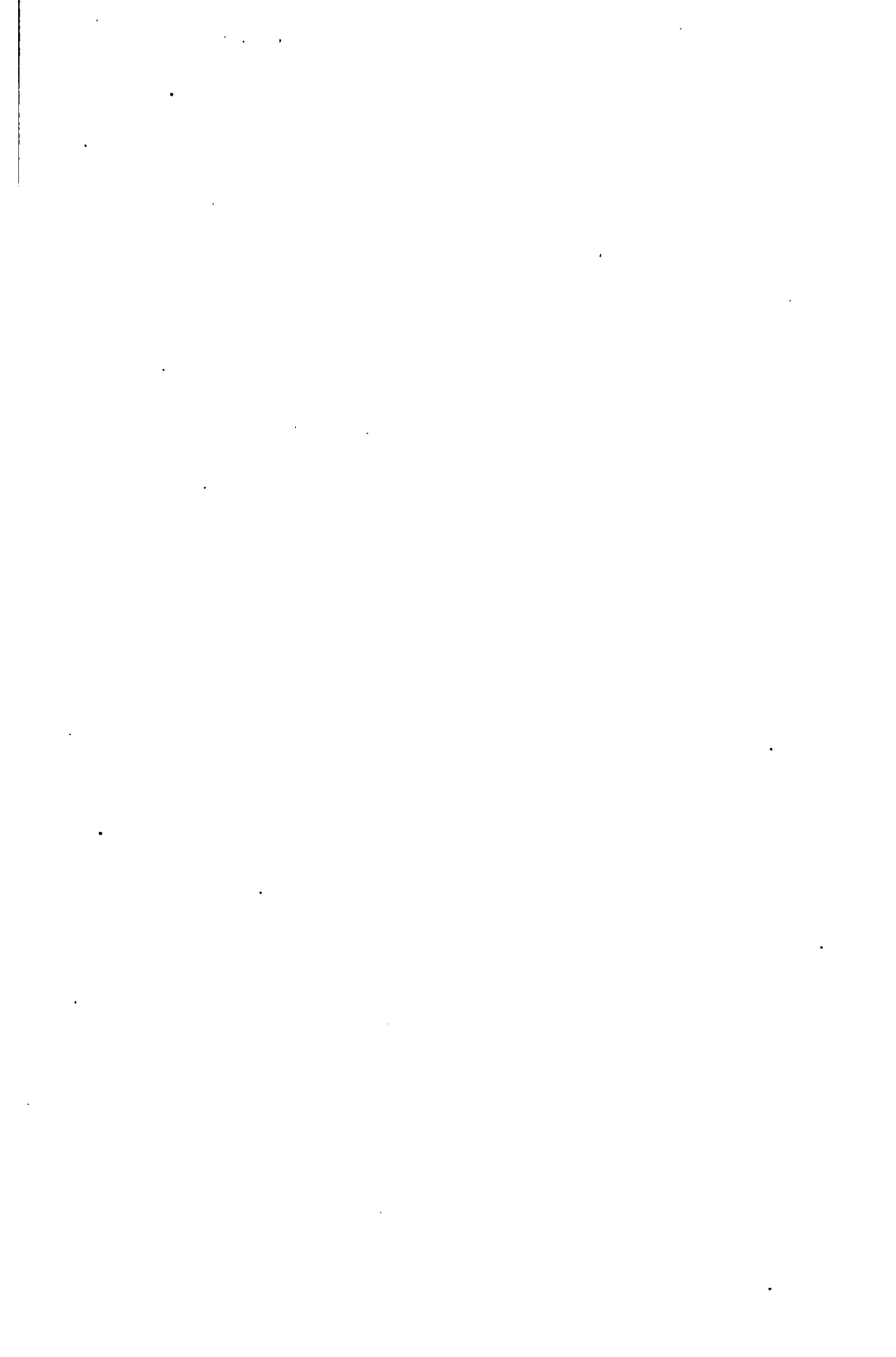
GEORGE H. MULLIN, Iowa City.....	} Term expires May 1, 1902.
W. A. DORAN, Mason City.....	
W. W. MONTGOMERY, Red Oak.....	} Term expires May 1, 1904.
PERRY D. ROSE, Jefferson.....	
I. J. McDUFFIE, LeMars.....	} Term expires May 1, 1906.
ROGER LEAVITT, Cedar Falls.....	

OFFICERS OF THE BOARD, 1901-1902.

RICHARD C. BARRETT, *ex officio*, Des Moines.....*President*
HOMER N. SILLIMAN, Cedar Falls.....*Treasurer*
ALFRED GRUNDY, Cedar Falls.....*Secretary*

STANDING COMMITTEES, 1901-1902.

Executive Committee.—George H. Mullin, W. A. Doran, I. J. McDuffie.
Finance Committee.—Perry D. Rose, W. W. Montgomery, Roger Leavitt.
Building Committee.—I. J. McDuffie, Roger Leavitt, W. W. Montgomery.



CALENDAR FOR SCHOOL YEAR, 1901-1902.

SUMMER TERM—SIX WEEKS.

1901—

June 15, Saturday, 8 A. M.—Enrollment day.
June 17, Monday, 8 A. M.—Recitations begin.
July 26, Friday, 12:15 P. M.—Recitations close.

FALL TERM—TWELVE WEEKS.

September 3, Tuesday, 8 A. M.—Enrollment day.
September 4, Wednesday, 8 A. M.—Recitations begin.
September 5, Thursday, 9 A. M.—Training Schools open.
November 26, Tuesday, 12:15 P. M.—Term closes.

WINTER TERM—TWELVE WEEKS.

December 3, Tuesday, 8 A. M.—Enrollment day.
December 4, Wednesday, 8 A. M.—Recitations begin.
December 19, Thursday, 12:15 P. M.—Holiday recess begins.

1902—

January 2, Wednesday, 8 A. M.—Recitations resumed.
March 5, Wednesday, 12:15 P. M.—Term closes.

SPRING TERM—TWELVE WEEKS.

March 11, Tuesday, 8 A. M.—Enrollment day.
March 12, Wednesday, 8 A. M.—Recitations begin.
June 6, Friday, 12:15 P. M.—Recitations close.
June 8-11—Commencement exercises.

SUMMER TERM—SIX WEEKS.

June 14, Saturday, 8 A. M.—Enrollment day.
June 16, Monday, 8 A. M.—Recitations begin.
July 25, Friday, 12:15 P. M.—Term closes.

REPORT OF BOARD OF TRUSTEES.

TEACHERS EMPLOYED AND COMPENSATION OF EACH PAID DURING BIENNIAL PERIOD FOR THE REGULAR SCHOOL YEAR, FALL, WINTER, AND SPRING TERMS.

	1899.	1900.	1901.
Homer H. Seerley, President.....	\$2,700	\$3,000	\$3,500
Moses W. Bartlett, English.....	1,600	1,600	*1,200
David S. Wright, Mathematics.....	1,600	1,600	1,600
Anna E. McGovern, Methods.....	1,200	1,200	1,200
Sarah M. Riggs, History.....	1,000	1,000	1,100
Julia E. Curtis, Music†.....	250	250	250
Abbott C. Page, Chemistry.....	1,600	1,600	1,600
Emma M. Ridley, History.....	1,100	.....	.....
Melvin F. Arey, Natural Science.....	1,600	1,600	1,600
Leonard W. Parish, Political Science.....	1,600	1,600	1,600
William A. Dinwiddie, Military Science.....	500	800	600
Mary E. Simmons, English.....	1,000	.....	1,200
George W. Samson, Psychology.....	1,600	1,600	1,600
Arthur W. Rich, Mathematics.....	1,500	1,500	1,600
Etta Suplee, Training School.....	1,000	1,000	1,100
Charles A. Frederick, Physics.....	950	.....	.....
G. W. Walters, Didactics.....	1,500	1,500	1,600
Jennie E. Curtis, Physiography.....	900	900	1,000
Henrietta Thornton, Drawing.....	1,000	1,000	1,100
Myra E. Call, Latin.....	900	900	1,000
Bertha L. Patt, Drawing.....	.....	800	900
Eva L. Gregg, English.....	800	900	900
C. P. Colgrove, Psychology.....	1,000	1,600	1,600
F. A. Fitzgerald, Instrumental Music‡.....	600	600	750
Wilbur H. Bender, Training School.....	1,500	1,500	1,600
Edith C. Buck, Methods.....	900	900	1,000
Laura Falkler, Elocution and Reading.....	750	750	800
George W. Newton, Natural Science.....	1,200	1,200	1,400
C. A. Fullerton, Vocal Music.....	1,000	1,000	1,200
Enola Pearl Pierce, Elocution.....	800	800	900
Stella Satterthwait, Physical Culture.....	650	750	800
Sara F. Rice, History.....	900	900	1,000
Harry C. Cummins, Penmanship.....	600	800	1,000
Mary S. Morse, Drawing.....	750	.....	.....
F. C. Eastman, Latin.....	1,400	1,600	1,600
Ira S. Condit, Mathematics.....	1,200	1,200	1,400

*Three-fourths work.

†Part year.

‡Fees additional for personal instruction.

Jennie G. Hutchison, Latin.....	650	700	750
Elizabeth Hughes, Training School....	650	700	750
Laura Seals, Mathematics.....	†360	700	750
Louis Begeman, Physics.....		1,400	1,400
Jennie Carpenter, English.....		800	900
Carrie B. Parker, Training School.....		700	750
Maud Humphrey, Geography.....		700	750
Ruth Adsit, Training School.....		450	600
S. F. Hersey, Physics.....		1,000	1,100
Mamie F. Hearst, English Grammar.....		700	750
W. W. Gist, English.....			1,600
Karl F. Geiser, Political Science.....			1,000
J. B. Knoepfler, German.....			1,400
Charles Henry, Training School.....			†390

ANNUAL SALARIES PAID OTHER EMPLOYES SINCE JUNE 30, 1899.

Secretary—president's office, 1899–1900.....	\$900
Secretary—president's office, 1900–1901.....	720
Stenographer—president's office.....	600
Stenographer—president's office.....	480
Superintendent of building and grounds, residence on grounds.	600
Engineer.....	600
Head janitor.....	600
Janitor.....	480
Janitor.....	480
Assistant janitor, part time.....	200
Fireman.....	540
Night watch.....	600
Librarian.....	600
Assistant Librarian.....	500
Cataloguer.....	600

SUPPORT OF SCHOOL FOR BIENNIAL PERIOD,
1900–1902.

APPROPRIATIONS, 1900–1902.

Teachers' fund, permanent.....	\$ 90,000.00
Contingent fund, permanent.....	28,000.00
Building fund.....	100,000.00
Repair fund.....	3,000.00
Library fund.....	3,000.00
Librarian fund.....	2,200.00
Military instruction fund.....	1,600.00
Summer term fund.....	12,000.00
Total.....	\$239,800.00

† Part year.

RECEIPTS FROM OTHER SOURCES.

During the biennial period the board has collected from students, tuition, and fees amounting to....	39,236.85
Compensation for teaching, in training school, pupils from Independent district of Cedar Falls, and Independent district No. 5, Cedar Falls Tp.....	5,077.45
Total receipts from all sources.....	\$284,114.30

SUMMER TERM SALARIES.*

	1900	1901
Homer H. Seerley, president	\$ 500.00	\$ 583.33
David S. Wright, mathematics.....	266.67	266.67
Anna E. McGovern, methods.....	200.00	.....
Abbott C. Page, science.....	266.67	266.67
M. F. Arey, science.....	266.67	266.67
L. W. Parish, political science.....	266.67	266.67
A. W. Rice, Mathematics.....	250.00	266.67
Sarah M. Riggs, History.....	166.67	.....
Etta Suplee.....	166.67	.....
G. W. Walters, Didactics.....	250.00	266.67
C. P. Colgrove, Didactics.....	266.67	.....
Henrietta Thornton, Drawing.....	166.67	.....
G. W. Newton, Science.....	200.00	233.34
Ira S. Condit, Mathematics.....	200.00	233.34
F. C. Eastman, Latin.....	266.67	266.67
Louis Begeman, Science.....	233.34	233.34
Jennie E. Curtis, Geography.....	150.00	166.67
Sara F. Rice, History.....	150.00	166.67
C. A. Fullerton, Music.....	166.67	200.00
Stella Satterthwait, Reading, Etc....	125.00	133.34
Harry C. Cummins, Penmanship and Bookkeeping	133.34	166.67
Jennie G. Hutchison, Latin.....	116.67	125.00
Jennette Carpenter, English.....	133.34	150.00
F. S. Hersey, Physics.....	166.67	183.34
Maud Humphrey, Geography.....	116.67	125.00
F. A. Fitzgerald, Music	75.00	85.00
Mamie Hearst, English.....	116.67	125.00
Geo. W. Samson, Psychology.....	.....	266.67
Lida B. Earhart, Methods.....	.....	200.00
Nellie V. Clute, Methods .....	.....	200.00
Laura Seals, Algebra.....	.....	125.00
Karl F. Geiser, Civics.....	.....	166.67
Carrie B. Parker, History.....	.....	125.00
Myra E. Call, Latin.....	.....	166.67
W. W. Gist, English.....	.....	266.67
Bertha L. Patt, Drawing.....	.....	150.00

*Summer Term salaries on same basis as regular school year.

J. B. Knoepfler, German.....	233.34	
Ralph Rigby, Music.....	80.00	
Chas. B. Stein, Music.....	25.00	
R. D. Barr, Music	25.00	
Emma H. Weidel, Methods.....	60.00	
	<hr/>	
	\$5,383.40	\$6,866.75

In the foregoing pages and in the respective reports of the secretary and treasurer of the Normal school may be found the facts required by the statutes to be specifically stated. The statutes also provide that the trustees may state in their report "such further information with such recommendations as may be regarded important to the interests of the institution, and with reference to its connection with the educational work of the state." Under the privilege thus granted, we present in this report the following facts and recommendations:

I. The number of students who have attended the Normal school, the number of teachers employed, and the aggregate amount of the salaries paid to teachers during each of the years from 1887 to 1901 inclusive appear in the following table:

YEAR.	Students.	Teachers.	Salaries.
1887.....	435	9	\$10,050
1888.....	432	10	10,950
1889.....	541	11	11,600
1890.....	657	12	12,450
1891.....	746	15	16,900
1892.....	706	16	18,200
1893.....	762	16	19,000
1894.....	800	18	20,150
1895.....	958	24	24,889
1896.....	1,059	26	27,300
1897.....	1,321	33	34,100
1898.....	1,429	34	35,525
1899.....	1,610	37	41,410
1900.....	1,751	42	45,800
1901.....	2,017	49	53,800

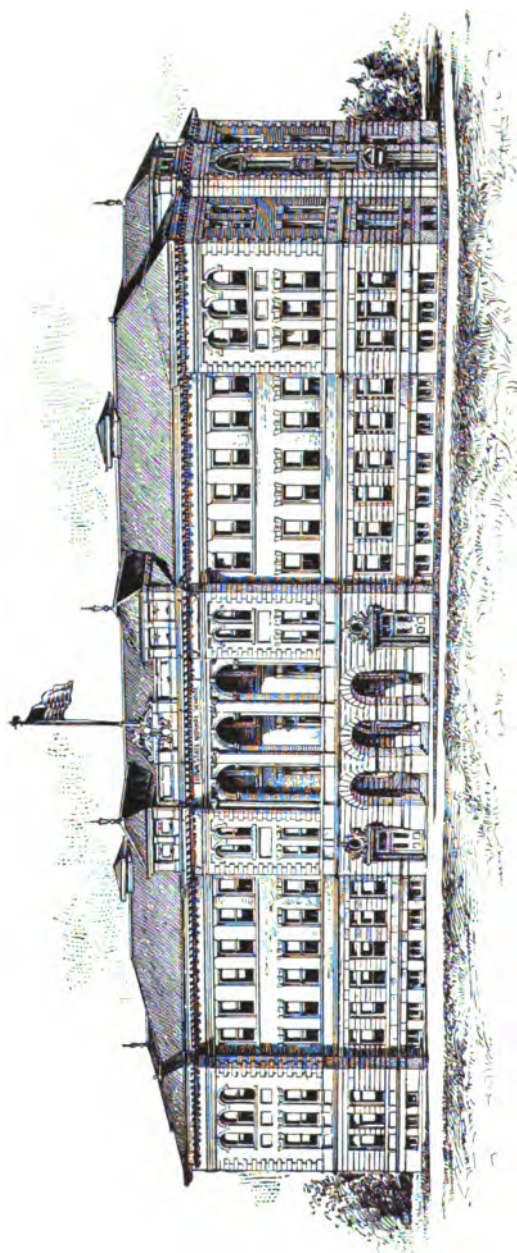
II. The following maps show the number of students attending the Normal school from each county in the state during each year of the last biennial period:

III. The following cuts show the style and character of the new building, with floor plans, now in process of construction. One hundred thousand dollars was appropriated by the Twenty-eighth General Assembly for the erection and equipment of this building, and the Board of Trustees hopes to have a portion of it completed by the first of September, 1901, and entirely completed by the first of December of the same year. For the first time in its history, the Normal school is supplied with a sufficient number of class-rooms to enable its work to be conducted to the best advantage. The building contains six society halls, a chapel capable of seating fifteen hundred students, and thirty-six class-rooms.

IV. The rapid growth of the Normal school and the uniform attendance of students from all parts of the state, seventy per cent. of whom had taught school before enrollment as students, show that the people of Iowa approve of the work of the school, and that they will cheerfully furnish all the means needed for its support. The Normal school undertakes, as its duty is under the statutes of Iowa, to give students instruction in physics and chemistry. The study of these subjects cannot be pursued to advantage without laboratories specially constructed and equipped. Physics and chemistry cannot be successfully taught in ordinary class or recitation rooms, and in buildings in which other subjects are taught.

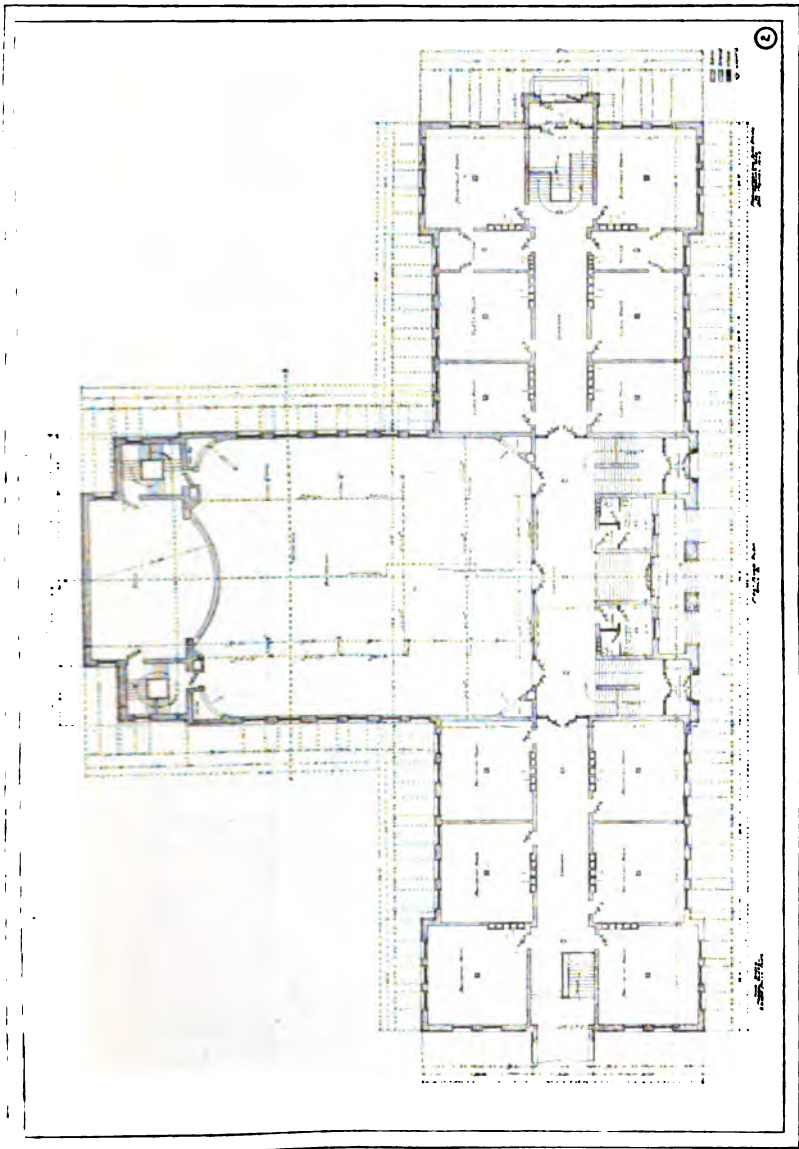
For this reason we earnestly recommend that a building not connected with any other be erected for the sole use of these two departments of the school. Such building can be erected and equipped for the sum of eighteen thousand dollars. Its erection and equipment ought to be provided for without delay as a matter of justice to the students who are required by law to qualify themselves to teach these subjects.

V. Within the last year, the Board of Trustees has decided to organize a department of physical education and has employed an instructor specially trained and qualified to carry on that work. The purpose is to give to each student thorough instruction in the elementary principles which govern the growth and development of the body, and to correct, as far as may be, possible defects in the physical development of each student. To carry on this work successfully, a gymnasium constructed and equipped upon modern principles is necessary. A gymnasium is not asked for with the view simply of furnishing a playground for students, but for the purpose of aiding in the proper instruc-

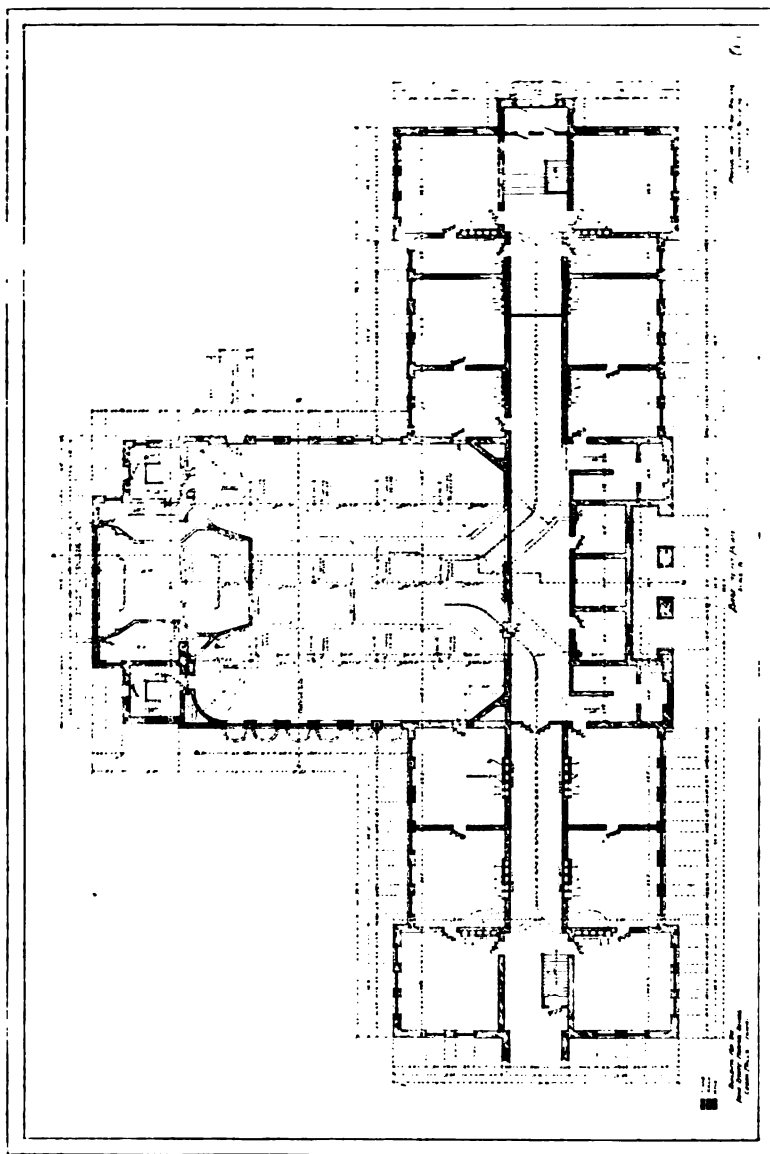


NORMAL DEPARTMENT, AUDITORIUM, TRAINING DEPARTMENT.
EAST FRONT OF NEW BUILDING.

IOWA STATE NORMAL SCHOOL.



BASEMENT PLAN

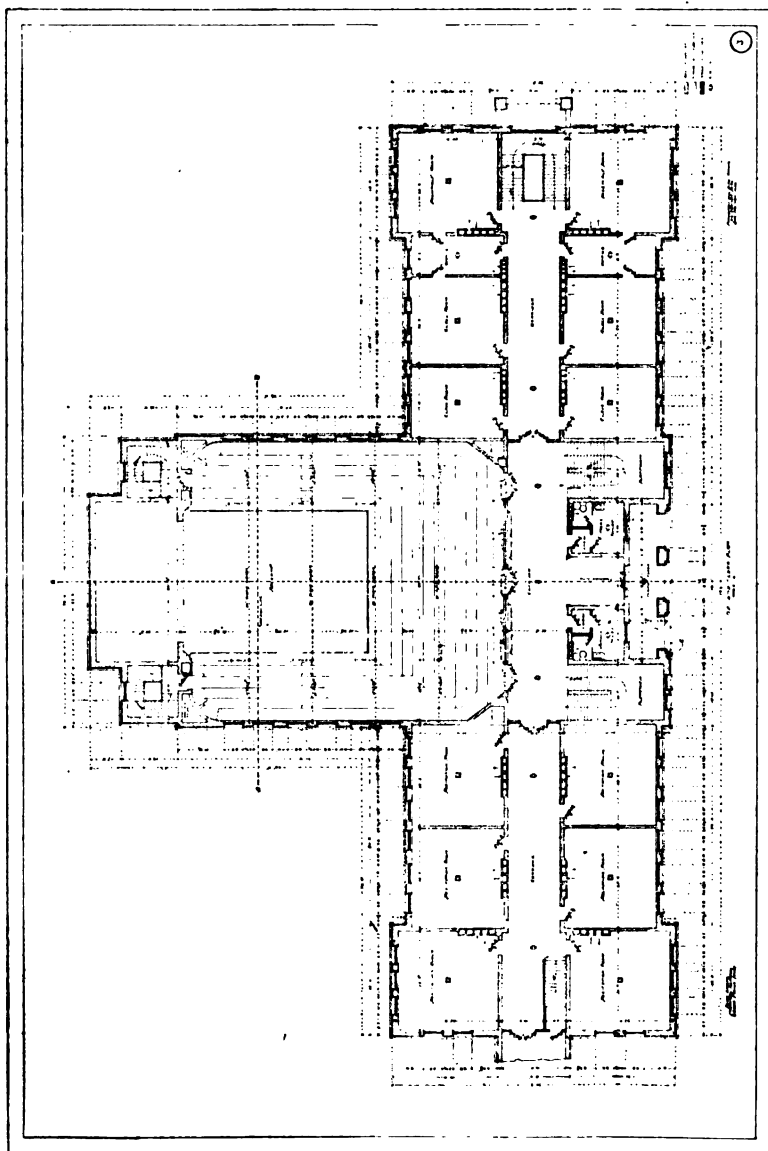


tion of students in the laws relating to health and life. A building such as is needed can be constructed and equipped for the sum of fifteen thousand dollars.

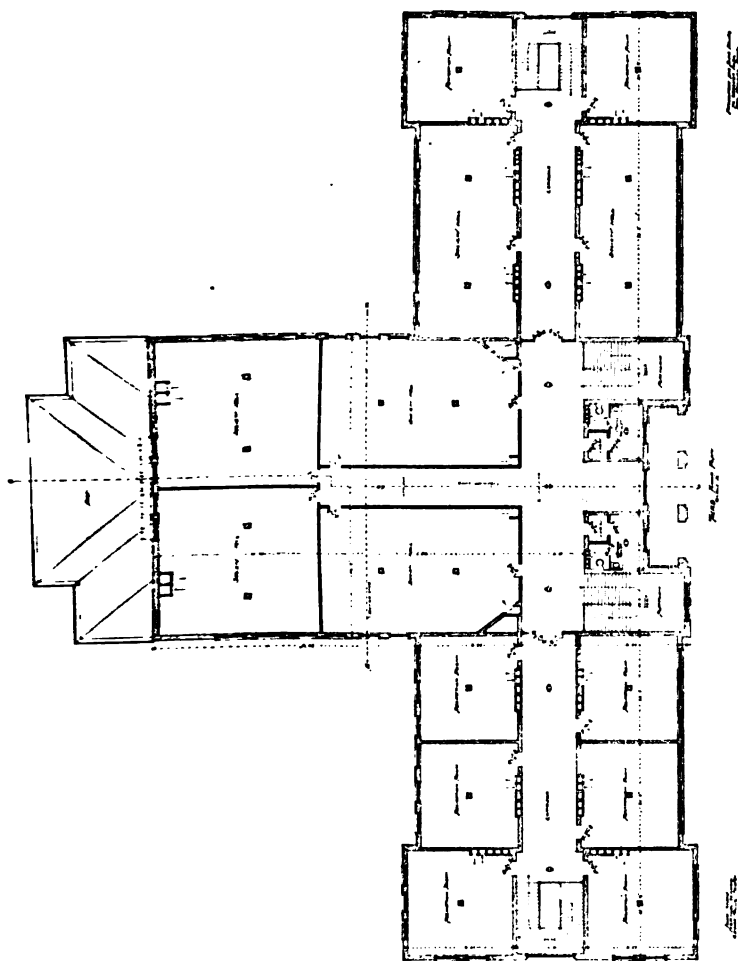
VI. The library of the Normal school is too valuable to be longer kept in a building that is not of fireproof construction. The room in which the library is now kept is too small to accommodate the students who necessarily go each day to the library for information to aid them in the prosecution of their studies. The library room is heated with steam, and, as students study in the same room in which the books are kept, the temperature of the room must be kept so high that the books in the library are being seriously injured. The Normal school needs and ought to have a building constructed as nearly fireproof as possible, and devoted solely to the uses of a repository for books and to reading rooms. The building ought to be so constructed that the books can be kept in a room with much lower temperature than the reading-rooms. A building of this character can be constructed for fifty thousand dollars, and we ask for that sum to be so used, believing that economy and the best interests of the school demand this expenditure.

VII. To meet the increased demand of a large number of teachers throughout the state who are unable to attend the regular terms of the Normal school, a summer term was established in 1897. The attendance at the summer term of 1897 was 180; term of 1898, 339; term of 1899, 471; term of 1900, 795; term of 1901, 925. Of those enrolled in 1897, three graduated; in 1898 eighteen graduated; in 1899, twenty-seven graduated; in 1900, thirty-two graduated; in 1901, fifty-one graduated. It being so clearly demonstrated that the needs of the state demand such a term, and that the teachers are eager to take advantage of the same, the board does not hesitate to urge the continuance of the appropriation for its support.

VIII. On account of the growth of the school, an additional annual appropriation of \$15,000 will be required to pay the salaries of teachers, and an additional \$10,000 to pay contingent expenses. The appropriation for the library ought to be increased because the sums appropriated for several years have been so small that, after paying the expense of binding periodicals and repairing books injured and worn by use, substantially nothing has been left with which to buy new books.



SECOND FLOOR PLAN.



THIRD FLOOR PLAN.

IX. Heretofore the Board of Trustees, for want of funds, has been able to do but very little in the way of improving and ornamenting the grounds of the Normal school. A large amount of grading ought to be done, roads ought to be made on three sides of and through the campus, and a large number of trees ought to be planted. All the walks leading to and connecting the several buildings are built of wood, and are rapidly decaying. These walks ought to be taken up and cement or brick walks constructed to take their places. A careful estimate of the cost of these much needed improvements has been made, and the Board estimates the cost thereof at \$3,500.

The Board asks for the following appropriations for the support of the Normal school during the next biennial period:

For payment of teachers, annually, additional.....	\$ 15,000
For payment of contingent expenses, annually, additional..	10,000
Total annual support needed	\$ 25,000
For repairs, for two years.....	3,000
For library, for two years.....	10,000
For summer school, for two years.....	12,000
For salary of librarian and two assistants, for two years....	4,000
For military instruction and expenses, for two years.....	1,600
For improvement of grounds.....	3,500
Total of temporary appropriations for two years needed \$	34,100
For erection of chemical and physical laboratories.....	18,000
For erection of gymnasium....	15,000
For erection of building for library.....	50,000
Total for buildings.....	\$ 83,000

The Board of Trustees feels that it ought not to close this report without bearing witness to the efficiency and zeal with which the president and faculty of the school have performed their duties, and the uniform good conduct of the students.

The reports of the president, secretary, and treasurer of the school are herewith submitted.

The Board of Trustees by their committee:

I. J. McDUFFIE,
GEO. H. MULLIN,
W. A. DORON.

Dated August 1, 1901.

REPORT OF THE PRESIDENT



IOWA STATE NORMAL SCHOOL.

REPORT OF THE PRESIDENT.

To the Honorable Board of Trustees, Iowa State Normal School:

GENTLEMEN—I have the honor to present herewith the thirteenth biennial report of the State Normal school for the period ending June 30, 1901.

HOMER H. SEERLEY,
President.

Cedar Falls, Iowa, August 1, 1901.

STATISTICAL SUMMARY FOR PERIOD.

I. ENROLLMENT BY COURSES AND CLASSES:		
	1899-1900	1900-1901
1. College graduate courses.....	3	5
2. Regular courses:		
Fourth year class.....	46	59
Third year class.	128	122
Second year class.....	206	184
First year class	491	554
Unclassified and special students.....	304	455
3. High school graduate courses:		
Third year class	39	48
Second year class.....	156	166
First year class.....	246	296
4. Special primary course:		
Second year class.....	50	39
First year class.....	88	89
Total normal department.....	1757	2017
5. Training school courses:		
Preparatory pupils.....	151	136
Grammar grade pupils.....	109	125
Primary grade pupils.....	87	95
Total training school.....	347	356
Grand Total.....	2140	2373
II. ENROLLMENT OF STUDENTS AS TO SEX:		
Men, normal department.....	457	493
Women, normal department.....	1300	1524
Total	1757	2017
III. GRADUATES FOR EACH YEAR:		
Masters of Didactics.....	56	50
Bachelors of Didactics.....	128	161
Total.....	184	211
IV. SPECIAL PRIMARY TEACHERS:		
Granted certificates.....	24	22

Growth of the school as shown by comparative statistics for the years 1896-1901:

ENROLLMENT.	1896	1897	1898	1899	1900	1901
1. College graduates	5	3	6	3	3	5
2. REGULAR COURSES:						
Fourth year class	27	35	23	34	46	59
Third year class	89	73	110	125	128	122
Second year class	157	177	207	269	206	184
First year class	394	419	471	451	491	554
Special class	12	137	137	216	304	455
3. HIGH SCHOOL GRADUATE COURSES:						
Third year class	11	23	24	26	39	48
Second year class	75	99	133	136	156	166
First year class	143	160	184	220	246	296
4. SPECIAL PRIMARY COURSE:						
All classes	73	91	134	137	138	128
Total normal students	986	1217	1429	1617	1757	2017
5. ENROLLMENT AS TO SEX:						
Men	288	350	400	418	457	493
Women	698	867	1029	1199	1300	1524
Total	986	1217	1429	1617	1757	2017
6. TEACHERS COMPLETING COURSES:						
Masters of Didactics	30	46	38	36	56	50
Bachelors of Didactics	97	91	128	118	128	161
Primary teachers	38	46	67	33	24	22
Total completing courses	165	183	233	187	208	233
7. TRAINING SCHOOL:						
Preparatory classes	93	104	131	153	151	136
Graded school pupils	116	123	149	162	196	220
Total	209	227	280	315	347	356
Grand Total	1195	1444	1709	1932	2104	2373

THE RESIDENCE OF STUDENTS.

The statistics compiled from the records of the school show a continuation of the development and expansion of the work being conducted by the Normal school for the education and training of teachers. There have been so many inquiries of recent years regarding the residence of students that a map showing the same for each year of the period is printed in these pages. It is to be noticed that the patronage is state wide, and that there is a growing demand for the kind of education that this school affords. Teachers change residence very frequently as they go from community to community from year to year, as the opportunity for suitable work occurs. There is a large number of Iowa teachers who really

have no permanent residence. There is placed on the margin of the maps, showing distribution of population, the number of those who claim Cedar Falls and Normal addition, a suburb of Cedar Falls, as their residence for the time being. Many of those have come with their families to become residents while they are completing their professional education.

The progress in additional enrollment, in increased efficiency in the Faculty, in breadth of opportunity as regards the program of studies, in the privileges allowing more specialization in preparation for teaching, in the practical field of training and individual qualifications in school management, is recognizable in every line of work offered and in every department organized, on carefully investigating the statistics presented.

THE STUDENTS.

Every care is taken to limit the enrollment to actual teachers or those who intend to become teachers. This is emphasized because the Normal school remains faithful to its special province determined by law as a school for "the instruction and training of teachers in the common schools." To give suggestive facts concerning the students enrolled, the school year of 1900-1901 has been selected as suitable for investigation and summary. In that year, 2,017 were enrolled in the teachers' department; of these, 1,376 had already taught in public schools, the average time devoted by this number being nearly eleven terms. Our students average older in age than the classes found in the colleges and higher schools, omitting the professional schools, and they have, in the most part, determined the bent of their ability and strength and know their preferences and plans. This fact enables the work of this school to be more effective and its results more marked, as each student who enrolls is ambitious to become proficient and strong as a teacher in all lines that are possible, so that he can occupy a remunerative position as an educator after graduation.

THE SIZE OF THE SCHOOL.

There is naturally great diversity of opinion regarding the number of students that ought to constitute the school where the best results are certainly obtainable. Some believe in the small school, where less than five hundred students are annually enrolled. They claim that the morals can be better assured, that the personal influence of the Faculty is more definite, that the teaching may be better managed and the conduct of the student may be better con-

trolled. This theory is on the basis of one good teacher to a department, and each teacher in the Faculty to teach all the students. The following facts remain, however, to be considered: that, while the Normal school is now favored by an enrollment that exceeds any other Iowa school, it can easily be established that the morals of its students, the work of its students, the spirit of its students, the influence of the Faculty upon the students, the control of the students in all matters of government and management, the success of its students when they go away to enter work, are not below par in any particular, and that the deportment, the character, and the spirit of the students are such as may be successfully compared, with credit to the Normal school, with any other educational institution in the country. There is, therefore, no argument for a large university or for a large college or a large work of any kind that does not equally apply to a large state Normal school. There are also many advantages that are possible with a large school that are entirely impossible with a smaller school. The great results attained at Cedar Falls—first by offering the whole program of studies every term; second, by the large number and kind of musical societies organized and maintained; third, by the extensive and successful lecture and entertainment courses that may be supported; fourth, by the division of labor among the Faculty so that more students and more recitations can be successfully handled by a single teacher, since a teacher's work is limited to one or two branches; fifth, by the opportunity thus granted to offer many elective lines of study with large differentiations to suit all varieties of students; sixth, by allowing classes to graduate four times a year, thus providing for many misfortunes that are sure to happen during the pursuance of several years of study;—all of these excellent privileges could not at all exist were it not for the large and varied student body that the large attendance provides.

CAUSES FOR THE EXPANSION

Public educational institutions grow in accordance with their success in meeting public demand. The Normal school, through its program of studies and its practical training in teaching, meets completely the necessities of those who enter the vocation of teaching, and gives them all the varieties and kinds of training that are essential to their professional careers, hence they prefer to give it their patronage by enrolling as students and thus make it the largest school in Iowa. The school has never depended

upon any method of advertising except the success of its representatives; it has not offered any specially extraordinary inducements, nor made any contracts, nor given any promises to those who have applied for concessions, except that it places no restrictions upon those who enroll beyond the requirement that they must do faithful and successful work in all its departments. The chief causes that have contributed to the unusual expansion in work and in attendance are just those that should commend the school to the people as a public institution, and can be enumerated as follows:

1. There is a gradually increasing demand for graduates of the school from school boards and school superintendents who have had its representatives in their corps of teachers, a demand that always far exceeds the supply. The management of the school has established the fact that its nominations are reliable and its service to the public certain, caring less to locate teachers than to have them successful.

2. The majority of the graduates of the school have had such marked success in the field at work that many communities recognize the decided difference between the trained and the untrained teacher, and show a decided preference for the trained.

3. The students who have enrolled have found the faculty specially excellent and decidedly helpful in personal, practical, and professional fitness. They publicly state that they are greatly benefited by attending the institution, so that they have been able to recognize that their progress is real and effective.

4. The training department has been exceptionally well managed, so that practice in teaching has been a reality, and the students pursuing work under the supervisors have had their eyes opened to the principles of teaching through the medium of applying their knowledge in actual teaching, being constantly compelled to modify and adapt their ideas and knowledge to the needs of their pupils. The training department is thus the important laboratory which differentiates the Normal school from other higher institutions of learning, and is essential to a scientific preparation of a teacher.

5. The harmony, peace, and internal conditions that have existed at the school for more than ten years have had much to do with contributing to the excellence of its work, the largeness of its influence, and the efficiency of its service, because the entire time and strength of the Faculty have been given to the legitimate work, it not being necessary to give thought and

time to controversies, adjustments of contentions, and discipline of students. The amount of class work and office work that has been regularly accomplished by each teacher has been excessive and would not have been possible had not the cooperation of all concerned been so generously granted.

THE FACILITIES INCREASED.

This biennial period has witnessed notable advancement in many respects, all of which have contributed to the usefulness of the school to the state at large, and to the individual students. The more notable of these are as follows:

1. The erection of the new building, giving to the work of the school sufficient floor space for the creditable conduct of affairs for the present, a condition which has not existed at any time for the past ten years.

2. The opening of the new departments of German and physical education, and the expanding of the range and the service of nearly all the departments.

3. The arranging of the class work of each term so that students can economically enter at the opening of any term and can continue their work without interruption or vexatious delays, even if compelled to omit any term for illness or other necessity, until graduation. The accomplishment of this arrangement gives all the work of each department practically every term of the school year and permits a class to graduate and to go to work at the end of each term—a consummation unexcelled by any other school of professional grade in the United States.

4. The further development and enlargement of the training schools through the reasonable considerations granted by the Independent School District of Cedar Falls and Rural Independent District No. 5, Cedar Falls township, whereby a superior training department has been successfully maintained. A State Normal School cannot be a practical training school for teachers and is not in reality efficient unless this department is permitted to grow and develop with the school's growth and development. The expansion of the present Normal school really began with the substantial and successful establishment of these efficient training departments for primary and grammar grades, and the increase of enrollment has grown and the reputation of the school has been improved in proportion as the efficiency of the training department has been strengthened and the practical training of the graduates has been possible.

THE SUMMER TERM.

The management of the Normal school takes pleasure in calling attention to the outcome of the effort to open the institution to the teachers of the state for the summer term for a period of six weeks, when the public schools are not in session. The teaching corps during this summer term has been equivalent to that of the regular sessions. The kind of work offered has been such as would accommodate the particular needs of rural school teachers, graded school teachers, high school teachers, principals, and superintendents. The enrollment for 1900 was 795; for 1901, 925. The 1901 session would have probably reached 1,200 had it not been for the presence of a few cases of a mild type of smallpox which appeared among the students near the close of the spring term. As it was, many who had already completed plans for work at the summer session canceled their contracts and went elsewhere, as would naturally be expected, although frequently they spent their vacations in cities where smallpox was much more prevalent though not so publicly proclaimed as at Cedar Falls.

The patronage given is an index of the need and of the possibility of rendering yet better service to the state through continuing the summer session and providing liberally for increasing its facilities and opportunities. It is a great opportunity to the teachers of this state to have the privileges of the laboratories, the library, and the instruction of the Normal school during their long vacation. The special organization of the Faculty, the direct practical features of the work that can be offered, all make the Normal school the place for summer work for teachers, since more can really be done for their professional benefit than elsewhere, as the equipment is designed specially for the education and training of teachers.

THE PRESENT NEEDS.

The development of a model public institution calls for additional facilities and equipment in proportion to the progress. The needs of public education should be liberally met by all that can be economically used for the benefit of the people. Every reasonable opportunity should be given to enable these educational instrumentalities to be the very best. There is no present day need more prominent nor more imperative than the training and preparing of public school teachers. The progress at this institution has been sufficiently marked to guarantee that its

future development and expansion will continue if the resources necessary are authorized. To this end, the requirements of the next biennial period are officially presented from the standpoint of the immediate needs that should be met to provide the means and equipment to enable the work to be properly done.

1. *Physical Education* The training of a teacher in these modern days demands actual physical training for his personal needs as well as his professional needs. The students who annually come to the Normal school are personally deficient in physique and proper knowledge of physical culture. The work now being conducted is hampered by lacking proper rooms and equipment. It is now time for the department of physical education to undertake the great task of examining and advising every student regarding his physical welfare, training, and health. But to do this work properly and efficiently requires the erection of a suitable gymnasium for men and another for women. Considering the number of teacher-students all the time enrolled here, there must be separate buildings for the sexes. These gymnasiums should have the necessary equipment and be specially planned to give such instruction as will lead to a training that will actually benefit every school taught by a normal student. The expenses of such buildings need not be large, as their architecture limits them to simplicity of construction even where all the facilities are provided. Considering the province of the Normal school and what its work means for the betterment of the schools of the state, provision for this department should be made without delay.

2. *A Physical Science Laboratory Building.* At no time in the history of the Normal school has its physical science work been commensurate with the demands required of it by the students in attendance. Physical science work has expanded so rapidly this year that all the floor space assigned to physics and chemistry is demanded by physics alone, and then the equipment is not sufficient. The recent statutes in the state requiring instruction in physical science to get a teacher's certificate have imposed a large work upon the Normal school.

Physics and chemistry cannot be taught effectively without much apparatus, laboratory space, and plenty of opportunity to do individual laboratory work. Hence it is now necessary to expand this department, and, since the keeping of chemicals in the main buildings is always a source of danger from spontaneous combustion, it is advisable that a suitable detached building be

erected which will more properly provide for the needs of this rapidly growing department. The expense need not be large, yet it should now be planned to give a permanent and modern equipment for this particular work.

3. *A Library Building.* The present buildings will all be needed for class room and offices for the several departments. The necessary expansion of the school is already demanding that the present library room become a study and reading room, and that a separate building specially planned for a library be erected. The growth of the school has been so rapid that the temporary quarters granted to the library have three different times been unable to accommodate existing necessities. One need now but visit the school at work to realize that double the present space is absolutely necessary for library work and privileges to properly accommodate such a large body of diligent and faithful students. It is a growing necessity then to separate the reading room department from the book and study department. The library room for such a school ought to make provision for fifty thousand or more volumes, and it should be a quiet place for special work and study, which is now impossible with our present facilities and temporary location. This matter is so important that a modification is urged in order to grant a permanent home to this most important department of the school.

ADDITIONAL TEACHERS NEEDED.

It is not easy to conjecture what the needs of such a school will be during the next biennial period, as expansion is certain and may greatly exceed past experience. But, as there must be explanations given for the requests for additional support, the writer refers to the several biennial reports he has written during the past fifteen years, and requests those who desire to investigate to read the conjectures there made and compare them with the demands afterward shown in the actual additional teachers employed. In my judgment, there will be early demands for the following additional teachers:

1. An instructor in penmanship and bookkeeping.
2. An instructor in natural science.
3. An instructor in physical science.
4. Three additional critic teachers for the training department.
5. An instructor in physical education.
6. A kindergarten teacher.
7. A manual training director.
8. An assistant in vocal music.

PRESENT SALARIES PAID THE FACULTY.

The salary question is always an unpleasant question to consider, but it must be understood that salaries should be commensurate with the qualifications and the service of the person employed. The contest between institutions for well qualified teachers in normal schools is gradually becoming a fact, and a number of our present teachers have sufficient professional preparation and reputation to be able to command more than the maximum salaries now paid. It is disastrous to a school to have its faculty gradually depleted by being called to other positions just because the salary paid is slightly better. The strength of a school depends upon the qualifications and the reputation of its teachers. It is to be hoped, therefore, that sufficient provision may be made to enable the Normal school to get the best the market affords, as new teachers are called, and to be, at the same time, able to pay its most successful workers sufficient salary to cause them to remain in the work they now so admirably conduct.

CONCLUSION.

This is the report of progress. It is constructive in its aim and assuring in its spirit. The state of Iowa has given evidence of desiring a superior training school for teachers at Cedar Falls, and the management intrusted with the work is willing to pledge its best endeavors for the future, pointing to the past, which it is glad to have investigated. There is much to encourage in the spirit of the school itself, as it gives great promise of the work its students and graduates will do throughout the state. The granting of the financial support that is essential can now barely be a question for discussion, as the work has certainly demonstrated its popular favor and its positive success. With such expectations for the future, and with a faith in the people of Iowa that they want the best prepared teachers in their schools, and that to assist in this direction is the mission of the State Normal school, this report is

Respectfully submitted,

HOMER H. SEERLEY,
President.

REPORT OF THE TREASURER



REPORT OF TREASURER

(Of Iowa State Normal School, for Biennial Period ending June 30, 1901:

1899.

July 1. Balance on hand.....\$ 8,971.18

RECEIVED IN CONTINGENT FUND.

Aug.	9.	A. Grundy, from E. H. Sargent & Co...	\$.25
Sept.	11.	State warrant.....	2,250.00
Oct.	30.	H. H. Seerley	133.00
Nov.	25.	From students' contingent fund.....	1,707.25
Dec.	2.	H. H. Seerley	18.69
Dec.	11.	State warrant.....	2,250.00

1900.

March	9.	H. H. Seerley	30.46
March	10.	State warrant.....	2,250.00
June	8.	State warrant.....	2,250.00
June	14.	H. H. Seerley	6.60
July	28.	H. H. Seerley	71.20
Aug.	24.	Cedar Falls School District.....	1,981.92
Aug.	24.	School District No. 5.....	280.89
Sept.	7.	State warrant.....	2,250.00
Oct.	19.	State warrant.....	1,250.00
Oct.	27.	From summer contingent fund.....	608.00
Nov.	28.	H. H. Seerley	6.98
Dec.	1.	State warrant.....	1,250.00
Dec.	4.	From students' contingent fund.....	2,532.11
Dec.	20.	State warrant.....	2,250.00

1901.

Feb.	14.	State warrant.....	2,500.00
March	7.	State warrant.....	2,250.00
March	11.	H. H. Seerley	22.03
May	17.	A. Grundy, error, freight.....	1.60
June	5.	State warrant.....	2,250.00
June	14.	H. H. Seerley	20.17
June	26.	H. H. Seerley	11.24
June	27.	From students' contingent fund.....	1,000.00
June	29.	Cedar Falls School District.....	2,470.80
June	29.	School District No. 5.....	343.84

Total.....		\$34,247.03
------------	--	-------------

RECEIVED IN LIBRARY FUND.

1899.		
Oct. 19.	H. H. Seerley	\$ 25.00
Dec. 2.	H. H. Seerley .....	.80
Dec. 11.	State warrant.....	500.00
Dec. 16.	From students' contingent fund	500.00
1900.		
March 9.	H. H. Seerley	36.61
June 14.	H. H. Seerley	26.90
July 28.	H. H. Seerley	7.60
Sept. 13.	From summer contingent fund.....	1,500.00
Nov. 28.	H. H. Seerley	18.02
1901.		
March 11.	H. H. Seerley	22.90
May 2.	State warrant.....	1,500.00
June 14.	H. H. Seerley	17.50
Total.....		\$ 4,154.98

RECEIVED IN LIBRARIAN'S SALARY FUND.

1899.		
Oct. 20.	State warrant.....	\$ 250.00
1900.		
March 16.	State warrant.....	250.00
Sept. 7.	State warrant.....	250.00
1901.		
March 27.	State warrant.....	550.00
Total.....		\$ 1,600.00

RECEIVED IN STUDENTS' CONTINGENT FUND.

1899.		
Sept. 5.	H. H. Seerley	\$ 1,975.00
Sept. 6.	H. H. Seerley	1,160.00
Sept. 7.	H. H. Seerley	442.00
Sept. 11.	H. H. Seerley	225.00
Sept. 12.	H. H. Seerley	160.00
Sept. 15.	H. H. Seerley	200.00
Sept. 16.	H. H. Seerley	120.00
Sept. 19.	H. H. Seerley	100.00
Sept. 23.	H. H. Seerley	88.00
Oct. 7.	H. H. Seerley	122.00
July 29.	H. H. Seerley	5.00
Sept. 9.	H. H. Seerley	310.00
Sept. 13.	H. H. Seerley	150.00
Oct. 19.	H. H. Seerley	34.44
Oct. 27.	H. H. Seerley	65.00
Dec. 1.	H. H. Seerley	1,060.00
Dec. 2.	H. H. Seerley	56.56
Dec. 4.	H. H. Seerley	1,450.00
Dec. 5.	H. H. Seerley	940.00
Dec. 6.	H. H. Seerley	548.17

Dec.	7.	H. H. Seerley	615.00
Dec.	9.	H. H. Seerley	65.00
Dec.	8.	H. H. Seerley	341.83
Dec.	13.	H. H. Seerley	298.40
Dec.	20.	H. H. Seerley	100.00

1900.

Jan.	6.	H. H. Seerley	57.80
Jan.	10.	H. H. Seerley	150.00
Feb.	1.	H. H. Seerley	125.00
March	9.	H. H. Seerley	44.30
March	9.	H. H. Seerley	110.53
March	19.	H. H. Seerley	2,160.00
March	20.	H. H. Seerley	1,850.00
March	22.	H. H. Seerley	547.90
March	26.	H. H. Seerley	250.00
April	3.	H. H. Seerley	166.57
May	5.	H. H. Seerley	153.20
June	14.	H. H. Seerley	52.80
July	27.	H. H. Seerley	27.00
Sept.	4.	H. H. Seerley	3,889.00
Sept.	5.	H. H. Seerley	465.00
Sept.	8.	H. H. Seerley	231.00
Sept.	22.	H. H. Seerley	334.30
Sept.	30.	H. H. Seerley	96.43
Nov.	28.	H. H. Seerley	76.77
Dec.	4.	H. H. Seerley	4,100.00
Dec.	5.	H. H. Seerley	845.00
Dec.	8.	H. H. Seerley	160.62
Dec.	15.	H. H. Seerley	153.75

1901.

Jan.	7.	H. H. Seerley	290.00
March	11.	H. H. Seerley	132.63
March	12.	H. H. Seerley	2,400.00
March	13.	H. H. Seerley	1,365.00
March	14.	H. H. Seerley	300.00
March	16.	H. H. Seerley	120.00
March	23.	H. H. Seerley	325.00
March	30.	H. H. Seerley	125.00
April	13.	H. H. Seerley	66.65
June	6.	H. H. Seerley	131.97
June	14.	H. H. Seerley	26.88

Total	\$31,960.50
-------------	-------------

RECEIVED IN BUILDING FUND.

1900

Oct.	8.	State warrant	\$10,000.00
Nov.	6.	State warrant	5,000.00
Dec.	1.	State warrant	5,000.00

1901.

Jan.	2.	State warrant	10,000.00
------	----	---------------------	-----------

March 27.	State warrant.....	10,000.00
April 4.	From library fund to correct error.....	169.80
May 2.	State warrant.....	10,000.00
June 27.	From students' contingent fund.....	6,669.27

Total..... \$56,839.07

RECEIVED IN MILITARY INSTRUCTION FUND.

1900

March 6.	State warrant.....	\$ 500.00
Oct. 8.	State warrant.....	300.00

1901

Feb. 7.	State warrant.....	500.00
---------	--------------------	--------

Total..... \$ 1,300.00

RECEIVED IN REPAIR FUND.

1899

Oct. 20.	State warrant.....	\$ 1,000.00
----------	--------------------	-------------

1900

June 14.	From students' contingent fund.....	59.81
Sept. 7.	State warrant.....	750.00
Oct. 11.	State warrant.....	750.00
Oct. 27.	From summer contingent fund.....	1,000.00
April. 6.	From building fund.....	140.57

Total..... \$ 3,700.38

RECEIVED IN SUMMER CONTINGENT FUND.

1899

July 3.	H. H. Seerley.....	\$ 135.00
July 7.	H. H. Seerley	120.00
July 22.	H. H. Seerley.....	80.00
July 29.	H. H. Seerley.....	87.50

1900

June 16.	H. H. Seerley	950.00
June 18.	H. H. Seerley.....	930.00
June 19.	H. H. Seerley.....	500.00
June 23.	H. H. Seerley.....	300.00
June 30.	H. H. Seerley.....	135.00
July 14.	H. H. Seerley.....	150.00
July 28.	H. H. Seerley.....	143.00

1901

June 15.	H. H. Seerley.....	1,215.00
June 17.	H. H. Seerley.....	1,057.00
June 18.	H. H. Seerley	280.00
June 26.	H. H. Seerley.....	718.50

Total..... \$ 6,801.00

RECEIVED IN SUMMER TERM FUND.

1900

June 22.	State warrant.....	\$ 6,000.00
----------	--------------------	-------------

RECEIVED IN WATER FUND.

1900

June 14.	From students' contingent fund.....	\$ 15.02
----------	-------------------------------------	----------

RECEIVED IN TEACHERS' FUND.

1899.

Sept. 11.	State warrant.....	\$ 5.00
Sept. 11.	State warrant.....	7,125.00
Oct. 20.	State warrant.	2,000.00
Nov. 25.	From students' contingent fund.....	4,500.00
Nov. 25.	From summer term fund.....	652.73
Dec. 11.	State warrant....	7,125.00
Dec. 16.	From students' contingent fund.....	2,500.00

1900.

Feb. 13.	State warrant.....	2,500.00
March 9.	State warrant.....	7,125.00
June 8.	State warrant.....	7,125.00
June 9.	Error order, 289 April 21, 1900.....	10.00
June 14.	From students' contingent fund.....	4,352.27
Sept. 7.	State warrant.....	7,125.00
Oct. 19.	State warrant.....	4,000.00
Oct. 27.	From students' contingent fund.....	5,000.00
Dec. 1.	State warrant.....	4,000.00
Dec. 4.	From students' contingent fund.....	1,000.00
Dec. 20.	State warrant.....	7,125.00

1901.

Feb. 14.	State warrant.....	4,000.00
March 7.	State warrant.....	7,125.00
May 2.	State warrant..	4,500.00
June 5.	State warrant.....	7,125.00
June 27.	From students' contingent fund.....	2,950.00

Total	\$ 98,970.00
-------------	--------------

Total receipts.....	\$254,559.16
---------------------	--------------

DISBURSEMENTS.

Orders paid on building fund.....	\$50,168.96
Orders paid on contingent fund.....	36,402.65
Orders paid on library fund	3,598.94
Orders paid on literary society fund.	30.05
Orders paid on librarian's salary fund.....	1,600.00
Orders paid on military instruction fund.....	1,347.17
Orders paid on repair fund	3,314.14
Orders paid on students' contingent fund	33,110.73
Orders paid on summer contingent fund..	7,519.00
Orders paid on summer term fund.....	5,897.42
Orders paid on teachers' fund	98,628.75
Orders paid on water fund.....	104.49

Total disbursements.....	\$241,722.30
--------------------------	--------------

Leaving balance cash on hand.....	\$ 12,836.86
-----------------------------------	--------------

Divided into funds as follows:

Building fund.....	\$ 6,670.11
Contingent fund.....	955.29
Library fund.....	861.18
Literary society fund.....	226.30
Repair fund....	456.82
Summer contingent fund.....	3,270.50
Summer term fund.....	102.53
Teachers' fund.....	341.25

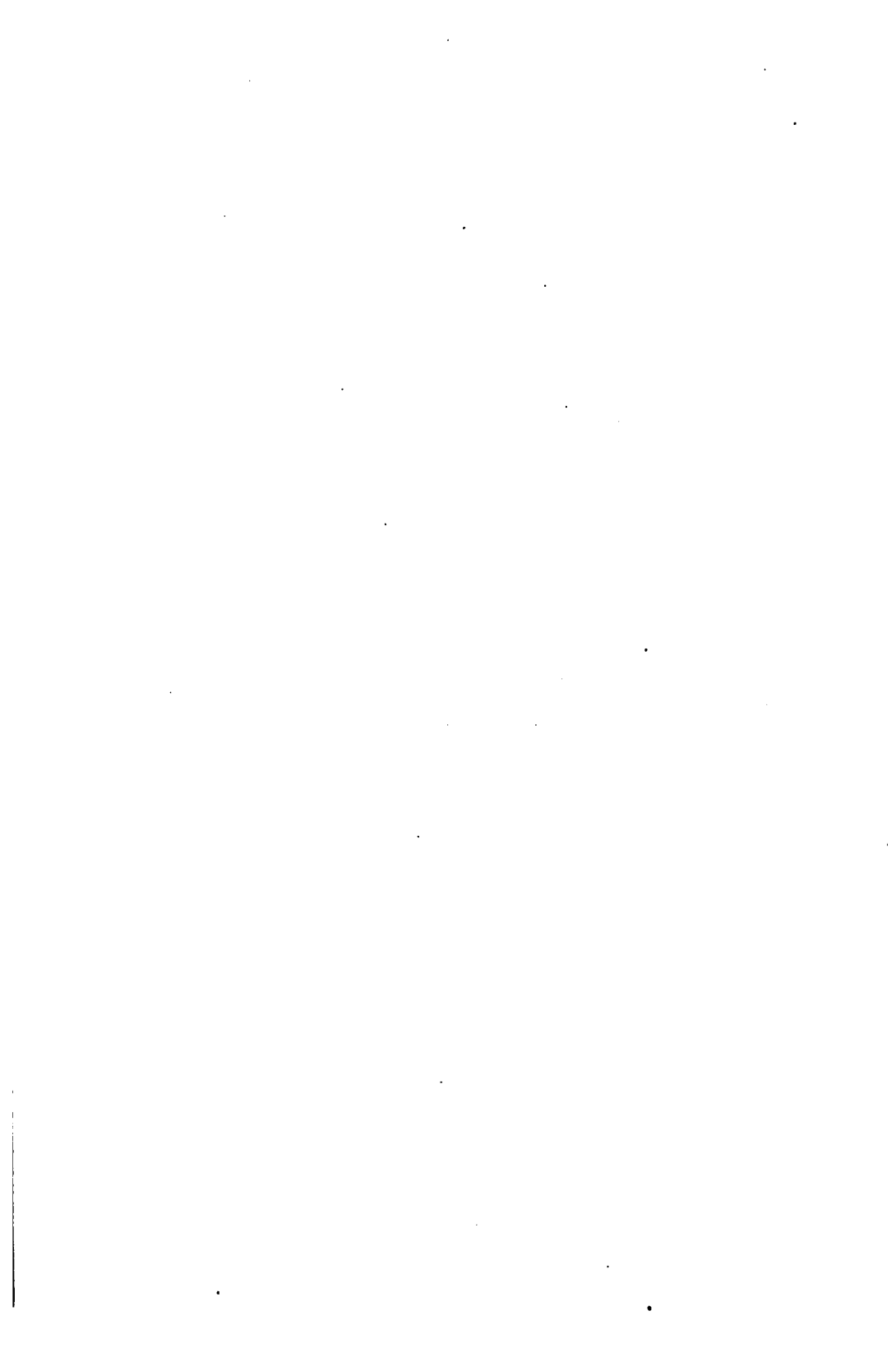
Total.....	\$12,884.03
Military instruction fund overdrawn, deduct.....	47.17

Leaves net cash..... \$ 12,836.86

All of which is respectfully submitted.

H. N. SILLIMAN,
Treasurer.

REPORT OF THE SECRETARY



To the Board of Trustees of the Iowa State Normal School:

GENTLEMEN—I herewith submit a summary of the orders issued by me on the several funds for the biennial period ending June 30, 1901.

TEACHERS' FUND.

Orders issued during 1899-00.. .. .	\$ 45,190.00
Orders issued during 1900-01.	53,428.75
Total.....	\$ 98,618.75

CONTINGENT FUND,

Orders issued during 1899-00.....	\$ 15,111.04
Orders issued during 1900-01.....	21,315.33
Total.....	\$ 36,426.37

LIBRARY FUND.

Orders issued during 1899-00.....	\$ 1,420.79
Orders issued during 1900-01.....	2,178.15
Total.....	\$ 3,598.94

LIBRARIANS' SALARY FUND.

Orders issued during 1899-00	\$ 5,000.00
Orders issued during 1900-01.....	1,100.00
Total.....	\$ 1,600.00

REPAIR FUND.

Orders issued during 1899-00.....	\$ 1,701.07
Orders issued during 1900-01.....	1,472.50
Total	\$ 3,173.57

STUDENTS' CONTINGENT FUND.

Orders issued during 1899-00	\$ 13,959.35
Orders issued during 1900-00.....	19,151.38
Total	\$ 33,110.73

WATER FUND.

Orders issued during 1899-00.....	\$ 104.49
-----------------------------------	-----------

MILITARY INSTRUCTION FUND.

Orders issued during 1899-00.....	\$ 500.00
Orders issued during 1900-01.....	847.17
Total.....	\$ 1,347.17

LITERARY SOCIETIES' FUND.

Orders issued during 1899-00.....	\$ 30.05
-----------------------------------	----------

SUMMER TERM FUND.

Orders issued during 1900-01.....	\$ 5,897.42
-----------------------------------	-------------

SUMMER TERM CONTINGENT FUND.

Orders issued during 1899-00.....	\$ 4,411.00
Orders issued during 1900-01.....	3,108.00
Total.....	\$ 7,519.00

NEW BUILDING FUND.

Orders issued during 1900-01.....	\$ 58,468.91
-----------------------------------	--------------

SUMMARY OF ORDERS ISSUED.

Teachers' fund.....	\$ 98,618.75
Contingent fund.....	36,426.37
Library fund.....	3,598.94
Librarians' salary fund.....	1,600.00
Repair fund.....	3,173.57
Students' contingent fund.....	33,110.73
Water fund.....	104.49
Military instruction fund.....	1,347.17
Literary societies' fund.....	30.05
Summer term fund.....	5,897.42
Summer term contingent fund.....	7,519.00
New building fund.....	58,468.91
Total.....	\$ 249,895.40

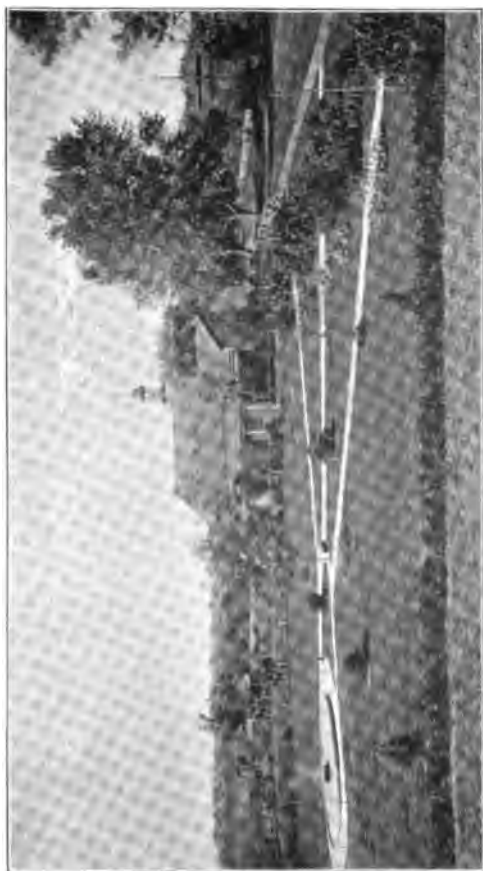
There will be noticed some differences between the amounts of the orders issued by me and the amounts paid by the Treasurer. These differences arise in this way: In the Teachers' Fund, an order was entered on his books for \$10.00 more than it called for, hence the discrepancy. In the Contingent Fund, the Treasurer paid an order for \$26.28, issued by me in the preceding biennial period, and there was one order for \$50.00 issued by me not presented for payment. In the Repair Fund, an order was drawn on the Building Fund for \$140.57 by mistake, and in correcting the error his account shows this order as paid out of the Repair Fund, and credited back to it.

In the Building Fund orders were issued in excess of the amount received with the understanding that they should not be presented for payment until October, 1901.

Respectfully submitted

A. GRUNDY,
Secretary.





ARTISIAN WELL AT LA BULA THAT FURNISHES STATE RETAINING POND WITH WATER.



HATCHING PONDS, STATE HATCHERY

REPORT.

To His Excellency, Leslie M. Shaw, Governor of the State of Iowa:

DEAR SIR—Pursuant to the provisions of section 2539, creating the office of fish and game warden, I submit herewith for your consideration the fourteenth biennial report of the state fish commissioner and the second biennial report of the state game warden.

The data contained within this report for the period prior to April 1, 1901, have been obtained from the various records and books to which I have had access, while the information covering the period from April 1, to November 1, 1901, is from my personal knowledge and actual experience, my appointment to the office having been made at the first mentioned date. I should be pleased to make a further and more detailed report of the placing of fish in private waters throughout the state had I the data at hand. In relation to the public waters, their disposition is fully shown herein.

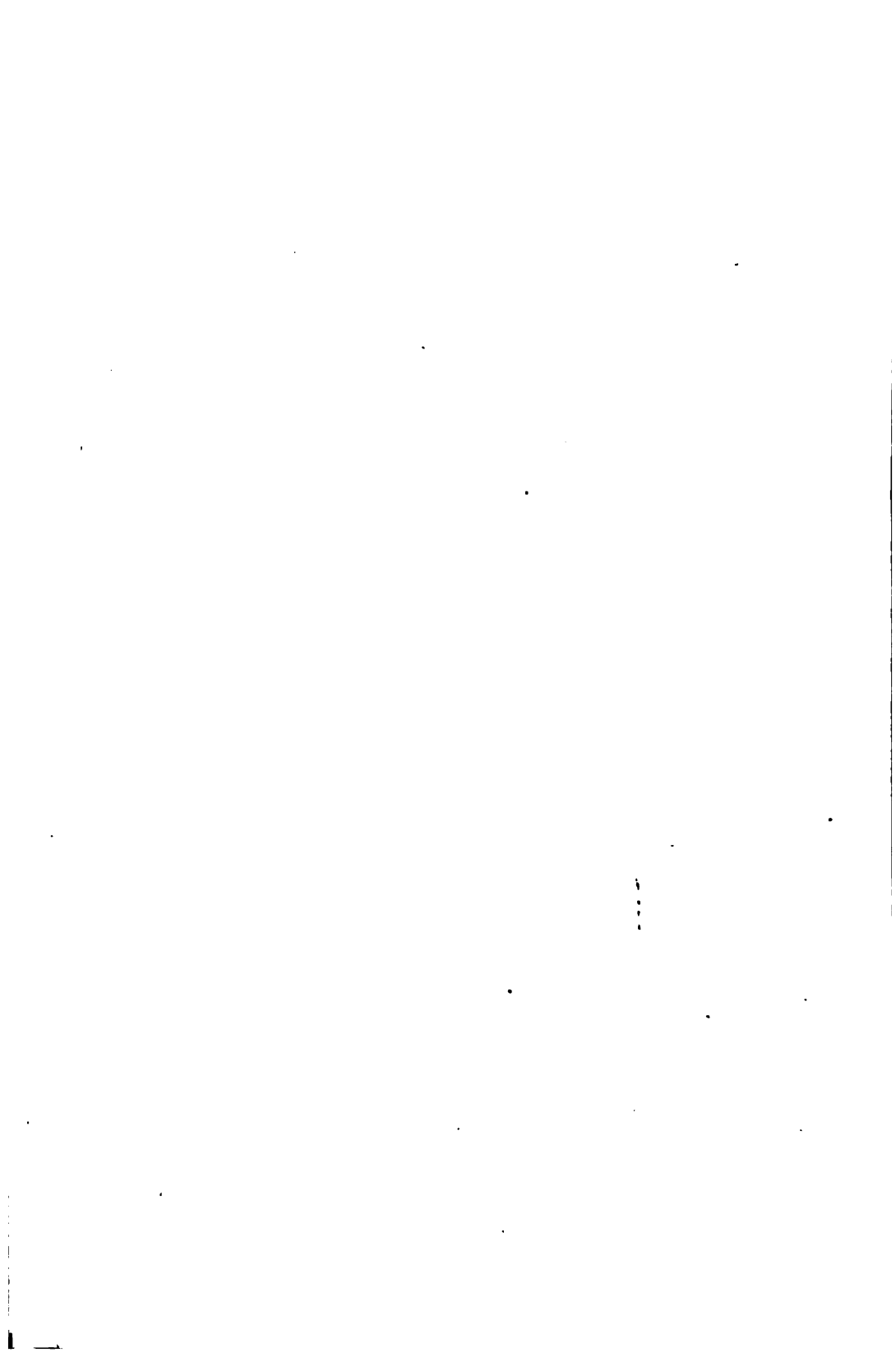
The articles contained in the following inventory came into my hands as state property from former warden, George E. Delavan. Except for the seines and some other minor articles, the same were in good condition throughout:

- 1 50-foot seine, 1 inch mesh.
- 1 50-foot seine, 1 inch mesh.
- 9 glass hatching jars.
- 12 glass tubes for hatching jars.
- 1 aquarium, 2x6 feet.
- 4 zinc hatching boxes.
- 1 fish food chopper.
- 1 walnut table, 5 feet.
- 1 Code of Iowa, 1873.
- 1 old ledger, 1878.
- 1 commissioner's account book. (In car.)
- 1 commissioner's record.
- 1 blank book, canvas cover.
- 15 United States fish commissioners' reports.
- 6 40-gallon fish cans.
- 2 10-gallon fish cans.

- 2 12-foot troughs, for hatching boxes.
- 2 6-foot troughs.
- 1 250-barrel fish tank.
- 1 row-boat, with two pairs oars and anchor.
- 1 old boat and one pair oars.
- 1 grindstone and frame.
- 35 hatching boxes with trays.
- 13 carp pails.
- 1 handsaw.
- 1 handax.
- 1 pair pipetongs.
- 1 pick.
- 1 stove and pipe. (In hatchery.)
- 1 garden rake.
- 2 small monkey-wrenches.
- 2 Halliday windmills, and pumps. (One fan short.)
- 1 fish car.
- 20 fish tanks.
- 1 gasoline stove.
- 1 hard coal stove. (In car.)
- 1 cane seat revolving chair.
- Wood seat office chairs.
- 1 cuspidor.
- 5 bracket car lamps. (Brass.)
- 1 coal hod.
- 10 sheets.
- 4 comforts.
- 8½ pair blankets.
- 4 pillows.
- 7 pillow-cases.
- 3 towels.
- 1 feather duster.
- 1 small broom.
- 1 screw-driver.
- 1 lot dishes and kitchen utensils.
- 2 bunk canvas.
- 12 journal brasses.
- 50 feet $\frac{3}{4}$ -inch hose.
- 1 400-foot seine.
- 1 200-foot seine.
- 1 150-foot seine.
- 1 75-foot seine,
- 1 1,200-foot seine, and ropes complete.
- 3 fish-pail yokes.
- 1 box report cuts. (In hands of F. R. Conaway.)
- 1 lawn mower at hatchery.
- 1 hatchet in car.
- 1 box report cuts in car.
- 1 gasoline launch, complete, Fairbanks and Morse engine. (Sabula.)
- 5 fish boxes. (Sabula.)



ARNOLOPE PARK.



STATE HATCHERY AND ASSISTANT SUPERINTENDENT'S RESIDENCE



1 boat-house 32 by 12 feet and anchor ropes complete. (Sabula.)
1 lawn mower. (Sabula.)
1 rake. (Sabula.)
150 feet 1-inch rubber hose. (Sabula.)
6 empty fish barrels. (Sabula.)
1 dip net. (Sabula.)

The only cost for equipment since my appointment has been for the placing of concrete bottoms in the state ponds at Sabula, for the repair of the windmills at the hatchery, and for the purchase of one new fishing boat.

STATE HATCHERY AT SPIRIT LAKE.

When the state hatchery was first located at Spirit Lake, there was a free flow of water between the two lakes "Spirit" and "East Okoboji," which seemed to insure a sufficient supply for the propagation of fish. However the water in each of these lakes has so far receded that there is now no connection between them, and the water furnished is inadequate for proper culture. This has rendered it necessary to pump all water used in the ponds by windmills, a slow and unsatisfactory process. What will be the outcome and disposition of this plant will have to be determined after the season is over and the final result of the year is shown. In preceding seasons Mr. S. B. Peterson, the superintendent, has raised a great many goldfish and carp, and a few varieties of game fish, which have been distributed at various places throughout the state as shown by former reports. This year, either on account of the extreme cold weather, the failure of the water-supply, or from other causes unknown, there have been so few even raised that there has been practically none for distribution. I am informed that all the hatcheries in Iowa have to a great extent proved disappointments and failures this season.

GATHERING FISH AT SABULA.

As pointed out in the last report of my predecessor in office, the facilities at Sabula for gathering small fish for distribution are unusually good, the equipment being first-class and the supply inexhaustible. The ponds, under the care of Mr. Charles H. Swift, are in fine condition. The presence of the state launch at Sabula will also prove of great assistance in securing quantities of fish from the rivers and bayous of the Mississippi, and I anticipate being able this fall to place within the interior waters of the state great quantities of food and game fish, consisting of black and silver bass, pike, crappie, perch, sunfish, and channel

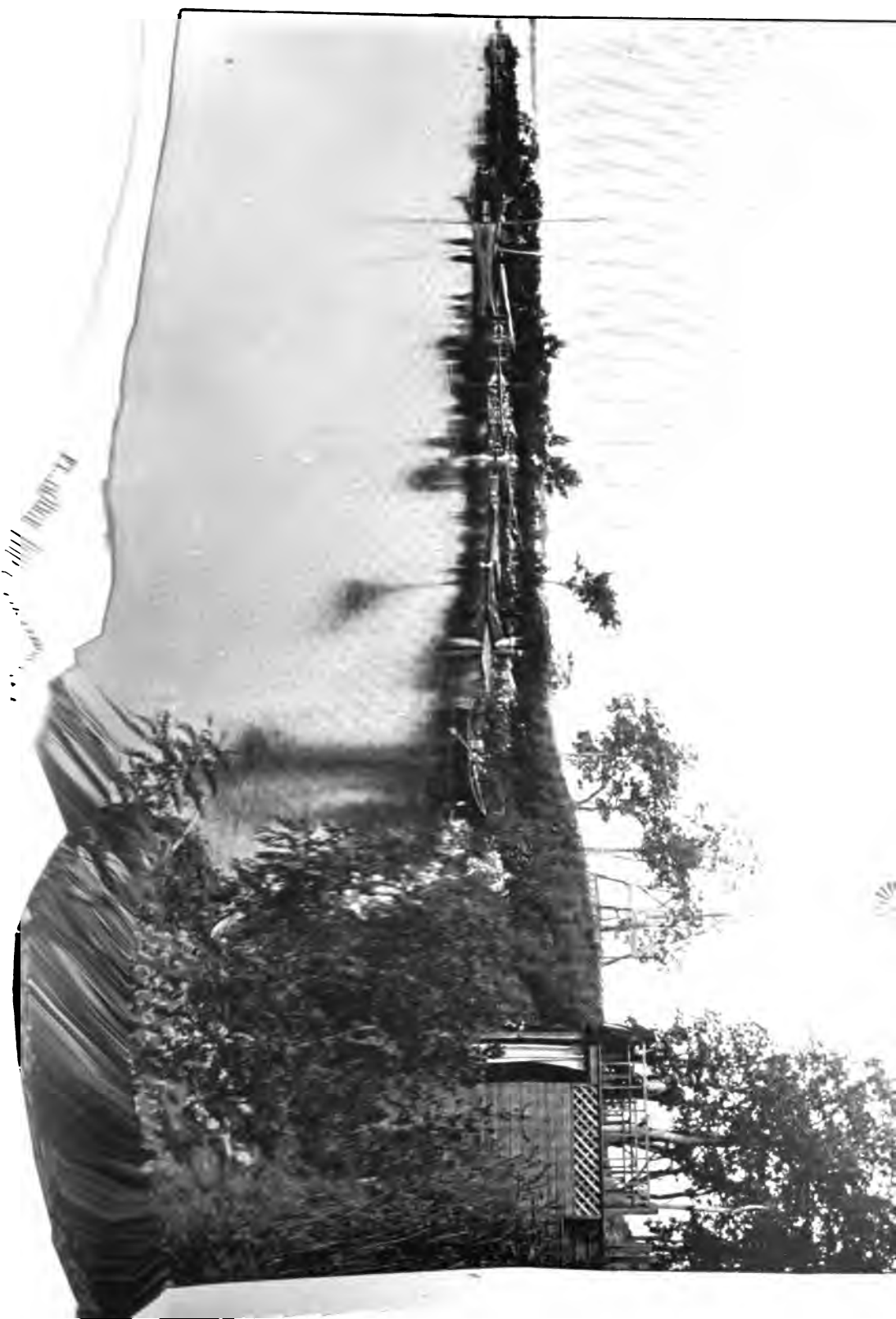
cat. This is to me very gratifying, inasmuch as last year, I am informed, the Mississippi was so high that it was impossible to secure sufficient quantities of fish for shipment, with the result that only a single car-load was sent out during 1900. This fall, however, as I believe after a careful examination, the conditions are fit for an abundant supply, and we will be able to replenish many of the interior lakes and rivers, beginning the work of distribution about the middle of September.

Could I use the car at all seasons of the year it would be impossible to supply all the many demands made upon me for fish, but I shall endeavor to divide the output as equitably as I may among the different sections of the state.

FISH AND GAME WARDENS.

I find during my short term that it is almost impossible, with the deputy system as it now is, to fully enforce the provisions of the fish law, especially those relating to seining and dynamiting. I have at this time 150 deputies, an increase since the last report of seventy-one, but many of them are deputies in name only, inasmuch as they are business men, who will not file informations against law-breakers in their own towns, but instead are willing only to make reports to me in order that I may set on foot the prosecutions. It is simply a physical impossibility for me to go to all the places where I am called. I have attempted to do so wherever sent for, but at times there have been from ten to fifteen cases at once, and I could not attend to them all. The whole system, in my opinion, is wrong, and should be changed to one wherein compensation is paid to the deputy wardens. It can readily be appreciated that work of the character these officers are called upon to do will bring to them more or less unpopularity among certain classes in their respective localities, to say nothing of the direct enmity of those men who are proceeded against. Few men care to enforce the law when there is no pecuniary compensation, at the same time risking the ill-will of their neighbors and of the pot-hunters, who are in many cases desperate and vindictive characters. A large number of these deputies have received their appointments laboring under a misapprehension of the fee system. They have sought the appointments under the impression that there was a direct compensation for the work, but, finding that this was a mistake and that they had to depend upon the fees alone, many have been disappointed and have failed to do or seek to accomplish anything. In many

PLANTING THE
TREE





TRUCKEE LAKE, MOUNT SHASTA



instances I have been compelled to pay a per diem and expenses for work done, believing that the state of Iowa needed the services performed and did not desire its officers to work without some compensation.

As the law now stands the fee of the informant is taxed against the poacher and is not made a part of the fine. Thus, when the poacher seeks to escape a term in jail he pays his fine, but not the fee of the deputy, and there is no way to compel him to pay this obligation save only the civil method of execution, which is in ninety-nine cases out of a hundred ineffectual. The law should be so amended as to punish the poacher and reward the deputy, and that commensurately with the hazards of the position.

To show the character of the men against whom he must act, one striking instance from Woodbury county will afford a timely illustration. Mr. James Halliday, a deputy warden of that county, found one "Peg-leg" Geist and Tom Teller, poachers, seining in McCook lake. He appeared as a witness against them, and they were convicted and fined, while their seines were destroyed. Burning with revenge, they started, immediately upon their release, for the home of Deputy Halliday, where they made a desperate assault upon him and his father, who in the encounter was struck over the head with an oar, while Teller received a shot in his leg. The next day Teller and Geist, reinforced by one Howard Teller, came again upon Mr. Halliday and his hired man working in the fields. In this attack Howard Teller was knocked senseless, and Deputy Halliday was cut in the face with a knife by Tom Teller. Mr. Halliday fired upon the latter, but the shots missed their mark. Even this assault was not sufficient for these desperate men, and Mr. Halliday has since found in his bundles of grain, while threshing, pieces of iron, placed there with evident intention to injure him and destroy his thresher. Presumably these were put there by these men or their sympathizers, which serves only to show the relentlessness of their antipathy.

I would recommend that a totally different system be adopted, and suggest the following plan. *First*, let the state be divided into districts similar to the present congressional ones. Then let good, reliable men be appointed in these to serve for a fair salary, the fines paid to go into a fund meant to pay these same deputies, that is, such part as should go to the complainant. This will render it certain that the informant would have compensation, so as to render him willing to incur the displeasure of his

neighbors, if such need be, while if reliable men be appointed this will insure good deputy service and obviate any possible tendency toward supineness because of a certain salary. The success of the plan will, in large measure, depend upon the reliability of the appointees, but for every public office there can be found men capable and honest and who will execute the duties connected with it. At any rate there should at least be made the change that the informant's fee be made a part, not of the costs, but of the fine, so that the fee will be paid by the poacher who seeks to avoid his jail sentence.

DYNAMITING AND SEINING.

The crime of dynamiting is the most inhuman of those within the warden's province, and also the most difficult to deal with. I recommend that the law should be amended as urged in the thirteenth biennial report, by former Warden Geo. E. Delavan, from which the following is an extract:

"We recommend that the law be changed so as to make the killing of fish by an explosive a felony. Under the present law the offense is made a misdemeanor, and the punishment does not fit the crime. We know of instances where thousands of choice small fish have been killed in this inhuman manner in order that the perpetrators might secure a few large ones."

The law as enacted by the Twenty-seventh General Assembly, making it a public nuisance to have in one's possession a seining net and equipment and giving the officer a right to seize the same without warrant, has been productive of much good. Our rivers and lakes in many places are swarming with carp and buffalo to the detriment of the game and the better classes of food fish. These species are destructive to the spawn of other fish, and are difficult to be ensnared, inasmuch as they will not bite at the ordinary hook. Furthermore, they multiply rapidly, and seining is prohibited as to them as well as to other fish by section 2540. I recommend that the law be so amended that they may be taken by spear or otherwise under the direction of your warden or his deputies, who shall be authorized to distribute the same as a food supply to those who are in need, or else to sell the fish thus taken in market. Such sale is feasible, inasmuch as these fish belong to those coarser families of food fish that are extensively used for food purposes.

During the winter season a great many of the small lakes and bayous freeze so solid that it is impossible for the fish to live. In several cases this spring, on the thawing of the ice, tons of all



POND AT LA BULA.



WILSON BOAT, OKLAHOMA

kinds of dead fish have floated to the shore in such a decayed condition that the health authorities were compelled to remove the same at a large expense. There is, further, an entire loss of this great amount of food supply. This is especially true of Cedar lake, situated within the city limits of Cedar Rapids, where, during the spring of 1901, thousands of pounds of fish were washed ashore. I would recommend an amendment to the law that in cases of this kind your warden be given power to allow the taking of these fish, under his direction, in any manner. There would thus be saved large amounts of food now annually destroyed.

The provisions of the Minnesota law on this subject are as follows:

"Provided, further, that the board of game and fish commissioners may, upon application and satisfactory proof made to them, grant permission to fish in all shallow lakes in the state where fish are annually frozen or smothered to death, under such rules, regulations, and restrictions as they shall prescribe, and the designation by them of such lakes shall be final and conclusive."

WANTON DESTRUCTION OF FISH.

The wanton destruction of fish in our lakes during the open season by anglers, who desire to see how many fish they can catch in a given time, should be prohibited. The fish-car annually, at an expense to the state, places fish in these lakes for the benefit of sportsmen, but some fishermen wantonly strive to deplete the stock of fish in a few days. Certain parties this season at Spirit Lake, in the space of one week, sent home seven barrels of fish, and on their return home took with them two more. These fish so shipped were but the pick of their catch during the week. I would recommend that the law be so amended that the catching of more than twenty-five fish by any one person in any one day shall be deemed a wanton destruction of fish in excess of that number, and shall be a misdemeanor with a proper fine attached.

PRIVATE FISH-PONDS.

I believe that every person who has the natural facilities therefor should have a pond for the raising of fish for food. I have received many communications on this subject, and while I have not been able to do much in this line this season, on account of the condition of the water at the hatchery and the excessive hot weather of this summer, which has necessarily prevented shipments, yet I shall endeavor to fill all such demands made upon me as fast as possible, being convinced that this industry will prove

an important adjunct to the people of this state and be an economic food resource.

FURTHER RECOMMENDATIONS.

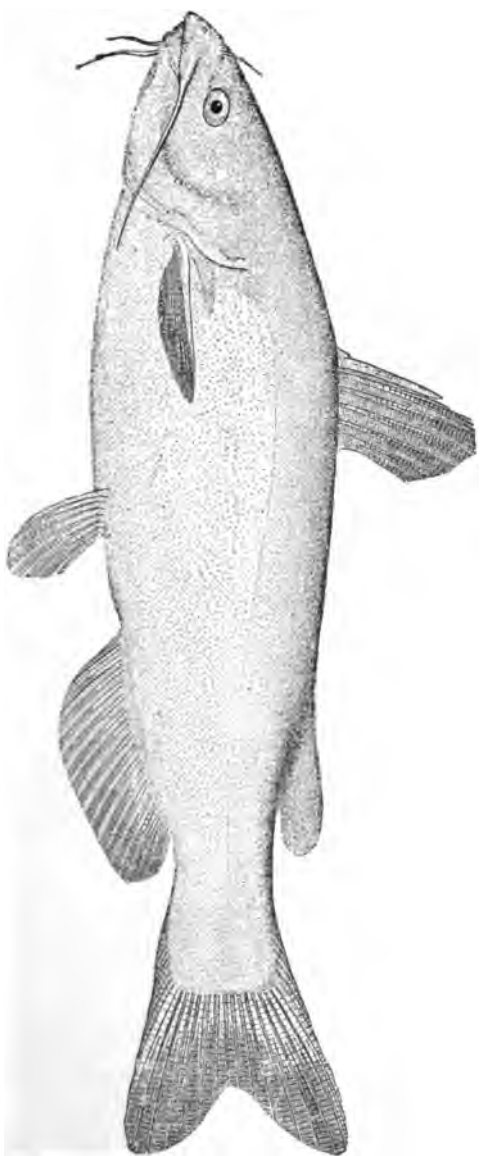
Your warden would further recommend an amendment to the law which will prevent fishing within 100 feet of any fishway. Fish congregate near such places and can be easily caught there in large quantities, so that the value of these is lessened, to say nothing of the wanton destruction that often ensues.

This season has been unprecedented in its exceedingly small rainfall. In consequence, the lakes and rivers of the state contain very little water, while, in some cases, they have dried up entirely. This has caused the destruction of a large amount of food-fish. In many cases your warden has seined them from the bayous into the rivers, and in some rivers placed them above and below the dams so as to get them into deeper water, but, in a large number of cases where the needed attention could not be given, the water has dried up and the fish have died, especially in the smaller lakes and streams.

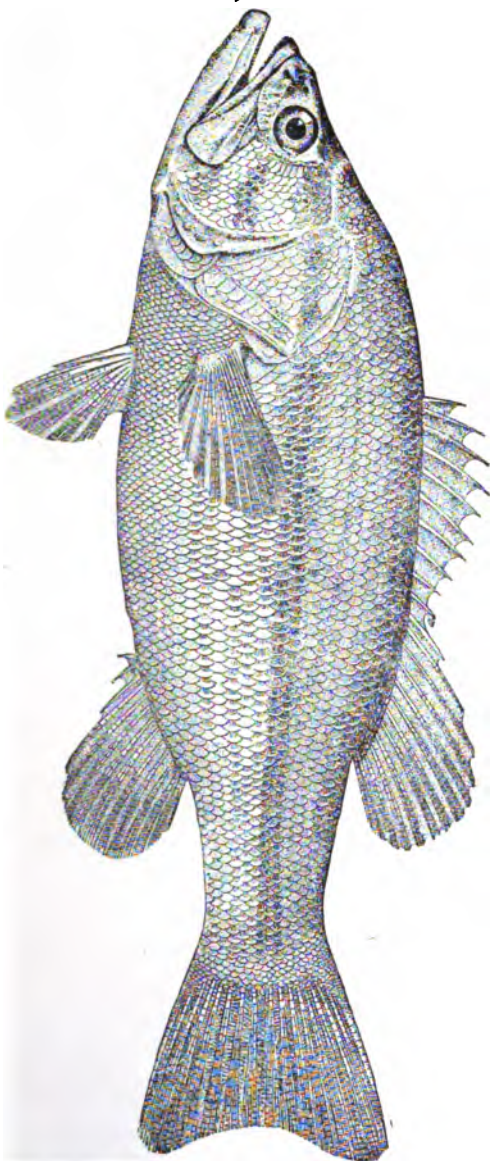
THE KILLING OF GAME-BIRDS.

This year has been excellent for the propagation of all species of game-birds. When the season opened both prairie chicken and quail were plentiful. I have taken especial interest in the enforcement of the game laws, and, while not entirely successful I have succeeded in arresting a number of poachers and in securing their conviction, and by my efforts, I trust, have prevented a wholesale slaughter. Quail are now found in abundance, and are, I am told, more plentiful than for a great many years. The shooting of prairie chicken before September 1st has cost quite a number of persons in various stations of society from \$50 to \$100 each and costs, and the lessons of these fines have prevented a good deal of illegal hunting. I would recommend that the law be changed on quail so as to make the open season between October 1st and December 1st.

In this connection, I will say that the federal law, commonly known as the Lacey act, introduced by Hon. J. F. Lacey, of Iowa, herein given in full, has been productive of much good. Poachers and pot-hunters, while not having any fear of the state laws, do not care to violate the statutes of the United States, inasmuch as under its detective system they are sure to be caught. Examples of this are the arrests made by your game warden in this state, where fines of \$100 and costs were imposed for ship-



THE CHANNEL CATFISH (*Ameiurus albidus*).



LARGE-MOUTHED BLACK BASS (*Micropterus salmoides*)

ping game out of our boundaries, all made on evidence furnished by United States marshals who seized the game in transit. Hereto is appended the Lacey act, and a copy of some instructions of the department:

AN ACT to enlarge the powers of the Department of Agriculture, prohibit the transportation by interstate commerce of game killed in violation of local laws, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the duties and powers of the department of agriculture are hereby enlarged so as to include the preservation, distribution, introduction, and restoration of game-birds and other wild birds. The secretary of agriculture is hereby authorized to adopt such measures as may be necessary to carry out the purposes of this act and to purchase such game-birds and other wild birds as may be required therefor, subject, however, to the laws of the various states and territories. The object and purpose of this act is to aid in the restoration of such birds in those parts of the United States adapted thereto where the same have become scarce or extinct, and also to regulate the introduction of American or foreign birds or animals in localities where they have not heretofore existed. The secretary of agriculture shall from time to time collect and publish useful information as to the propagation, uses, and preservation of such birds. And the secretary of agriculture shall make and publish all needful rules and regulations for carrying out the purposes of this act, and shall expend for said purposes such sums as Congress may appropriate therefor.

SEC. 2. That it shall be unlawful for any person or persons to import into the United States any foreign wild animal or bird except under special permit from the United States department of agriculture: *Provided*, That nothing in this section shall restrict the importation of natural history specimens for museums or scientific collections, or the importation of certain cage-birds, such as domestic canaries, parrots, or such other species as the secretary of agriculture may designate. The importation of the mongoose, the so-called "flying foxes" or fruit bats, the English sparrow, the starling, or such other birds or animals as the secretary of agriculture may from time to time declare injurious to the interest of agriculture or horticulture is hereby prohibited, and such species upon arrival at any of the ports of the United States shall be destroyed or returned at the expense of the owner. The secretary of the treasury is hereby authorized to make regulations for carrying into effect the provisions of this section.

SEC. 3 That it shall be unlawful for any person or persons to deliver to any common carrier, or for any common carrier to transport from one state or territory to another state or territory, or from the District of Columbia or Alaska to any state or territory, or from any state or territory to the District of Columbia or Alaska, any foreign animals or birds the importation of which is prohibited, or the dead bodies or parts thereof of any wild animals or birds, where such animals or birds have been killed in violation of the laws of the state, territory, or district in which the same were killed: *Provided*, That nothing herein shall prevent the transportation of any dead birds or animals killed during the season when the same may be lawfully captured,

and the export of which is not prohibited by law in the state, territory, or district in which the same are killed.

SEC. 4. That all packages containing such dead animals, birds, or parts thereof, when shipped by interstate commerce, as provided in section one of this act, shall be plainly and clearly marked, so that the name and address of the shipper and the nature of the contents may be readily ascertained on inspection of the outside of such packages. For each evasion or violation of this act the shipper shall, upon conviction, pay a fine of not exceeding two hundred dollars; and the consignee knowingly receiving such articles so shipped and transported in violation of this act shall, upon conviction, pay a fine not exceeding two hundred dollars; and the carrier knowingly carrying or transporting the same shall, upon conviction, pay a fine not exceeding two hundred dollars.

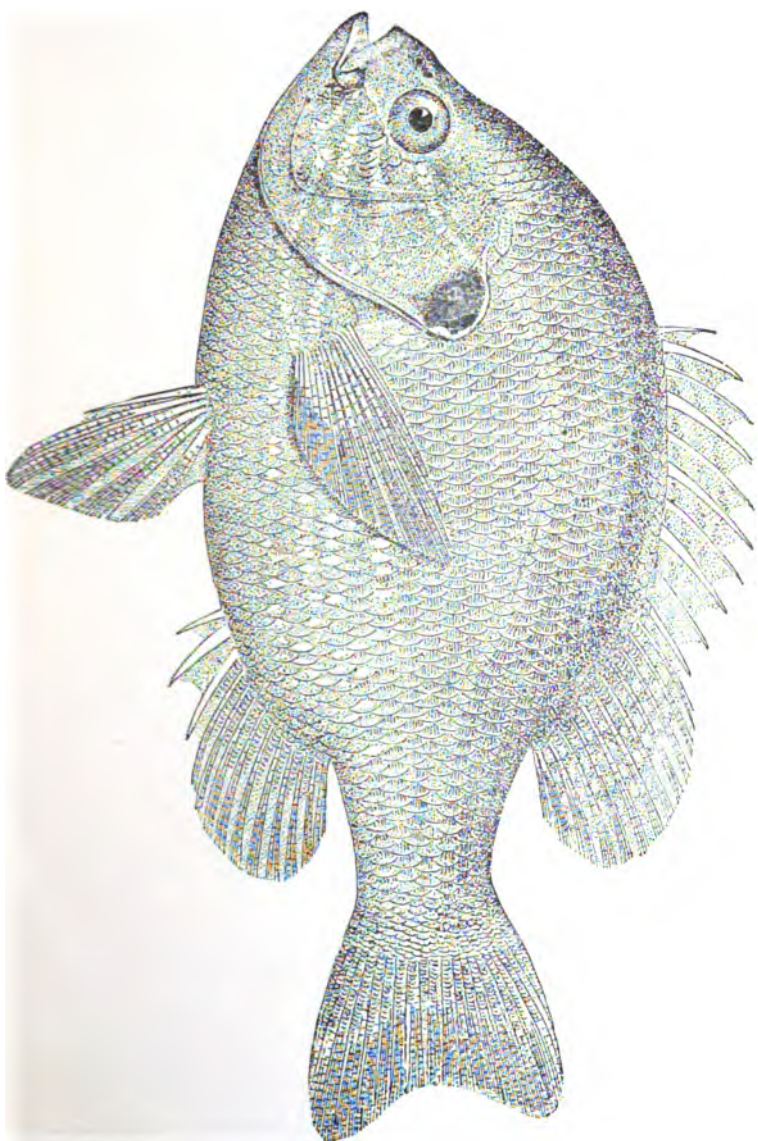
SEC. 5. That all dead bodies, or parts thereof, of any foreign game animals, or game or song birds, the importation of which is prohibited, or the dead bodies, or parts thereof, of any wild game animals, or game or song birds transported into any state or territory, or remaining therein for use, consumption, sale, or storage therein, shall upon arrival in such state or territory be subject to the operation and effect of the laws of such state or territory enacted in the exercise of its police powers, to the same extent and in the same manner as though such animals and birds had been produced in such state or territory, and shall not be exempt therefrom by reason of being introduced therein in original packages or otherwise. This act shall not prevent the importation, transportation, or sale of birds or bird-plumage manufactured from the feathers of barnyard fowl.

Approved, May 25, 1900.

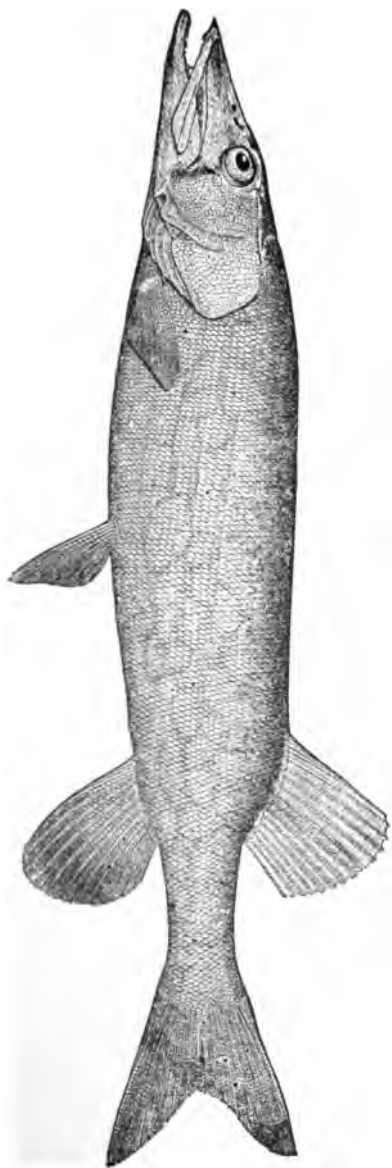
INTERSTATE TRAFFIC IN ANIMALS OR BIRDS KILLED OR SHIPPED IN
VIOLATION OF STATE LAWS.

The attention of sportsmen, commission merchants, shippers, and express agents is especially called to sections 3, 4, and 5, which make it unlawful to ship from one state to another animals or birds which have been killed or captured in violation of local laws, and which require all packages containing animals or birds to be plainly marked so that the name and address of the shipper and the nature of the contents may be ascertained by inspection of the outside of such packages. Common carriers are cautioned to notify their agents to insist that all packages supposed to contain game or other animals or birds must be marked with the shipper's name and the contents. Shipment in any form that tends to conceal or obscure the nature of the contents or the shipper's name and address is plainly an evasion of the act, and the penalty applies to evasions as well as to violations of the law. The act also prohibits interstate commerce in game, though killed in open seasons, if the law of the state in which such game is killed prohibits its export.

In referring to these sections, the House committee on interstate commerce reported as follows: "The killing or carrying of game within the limits of a state is a matter wholly within the jurisdiction of the state, but when the fruits of the violation of state law are carried beyond the state the nation alone has the power to forbid the transit and to punish those engaged in the traffic. This bill will give the game wardens the very power that they now lack and which will be the most effective for the purpose of breaking up this



PUMPKIN SEED OR COMMON SUNFISH (*Lepomis gibbosus*).



THE PICKEREL (*Esoxreticulatus* L. S. S. S. S.).

commerce. * * * In some of the states the sale of certain game is forbidden at all seasons without regard to the place where the same was killed. The purpose of these laws is to prevent the sale of game shipped into the state from being used as a cloak for the sale of game killed within the state in violation of local laws." Section 5 of the act is intended to meet this difficulty by subjecting imported animals, birds, or game, whether introduced in original packages or otherwise, to the laws of the state in which imported.

I consider that the spring shooting of ducks should be prohibited, and I would recommend that the law be so amended that the closed season for ducks shall be between the first day of January and the first day of September.

SELLING OF GAME BY MERCHANTS.

Section 2552 of the Code prohibits and makes it a crime for any person to trap, shoot, or keep for traffic, prairie chicken, woodcock, quail, or ruffed grouse.

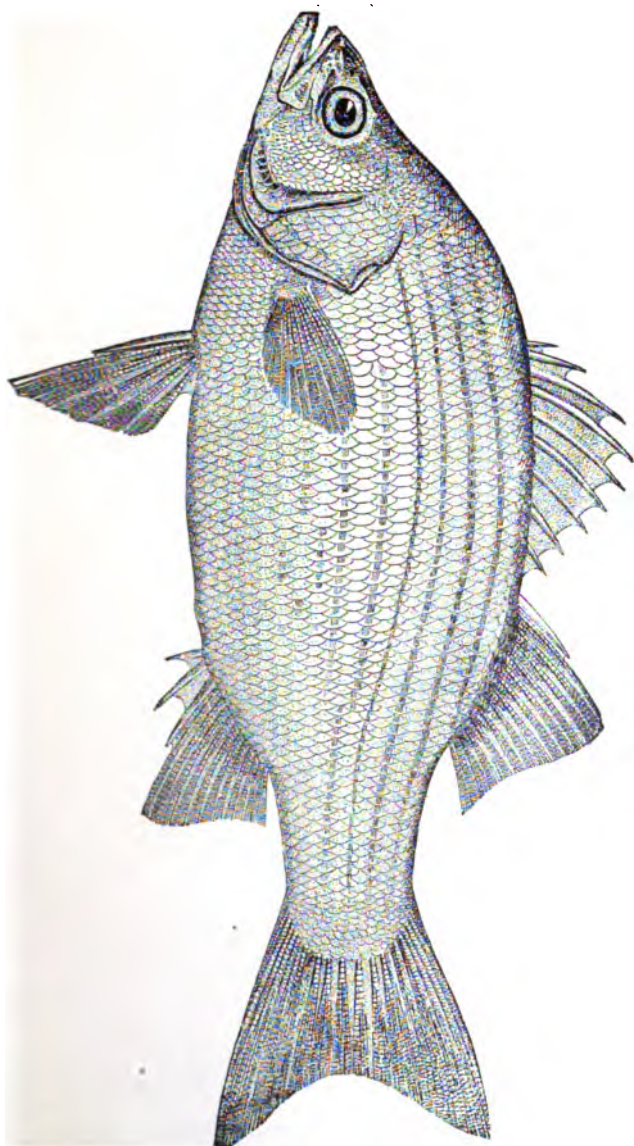
Section 2554 makes it an offense for any person, company, or corporation to buy, sell, or have possession of any such birds or animals during the period when the killing thereof is prohibited, except during the first five days of such prohibited period.

Section 2555 provides that no person, company, or corporation shall at any time ship, take, or carry out of the state any of the birds or animals named; but that it shall be lawful to ship to any person within the state, during the period when the killing of such birds is not prohibited, any of the game-birds mentioned, not to exceed one dozen in any one day, provided an affidavit, made before some person authorized to administer oaths, to the effect that the birds have not been unlawfully killed, bought, sold, or had in possession, and are not shipped for sale or profit, is made and attached to the birds so shipped. The attorney-general informs your warden under date of September, 6, 1901, that neither of these sections, in terms or in language which will bear such construction as prohibits the sale of such game-birds within the state during the open period. While it was the evident intent of the legislature to prohibit the sale of game-birds within the state at the time the law was enacted, the sections intended to cover this point in the opinion of the attorney-general cannot be so construed. I would recommend that the law be so amended as either to prohibit the sale of game-birds in any manner or by any person in this state, or to allow them to be sold only during the open season. In this connection, on this subject which has both a commercial bearing and a sport-

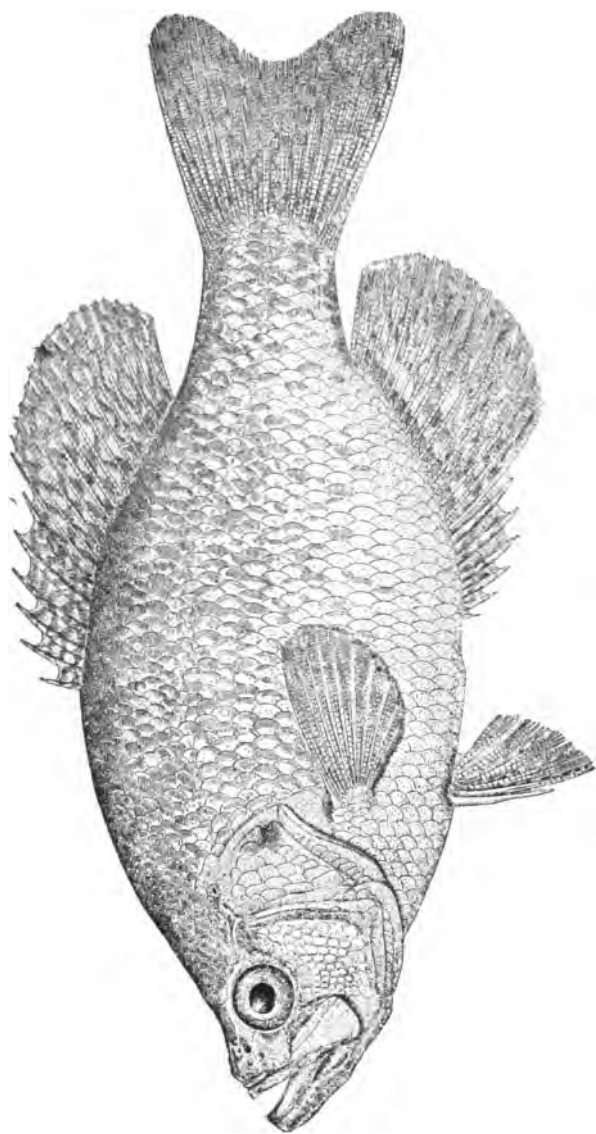
ing interest, it may be well to call attention to the fact that the state is accused of favoring the sporting interest in preference to the commercial. Those who are not hunters ask that they may be allowed to have the privilege of purchasing wild game during the open season, while the sportsmen claim that if commercial traffic be permitted the game will soon be extinct. This is a question for the legislature to decide, and when so decided your warden will endeavor to see that the provisions of the law are enforced. The state of Illinois provides for the sale during the open season of those game-birds that are not killed within the limits of the state, thus protecting its own game-birds from the raids of the pot-hunters.

MEANDERED LAKES.

The question of the shore-line of the meandered lakes of the state is causing a great deal of controversy, as parties, who own land contiguous to the lakes where the water has dried up and receded have in some cases extended their fences in to the water edge as it now is. They then have claimed ownership of this land, endeavoring to prevent trespassing upon the same under the law, section 2560, "Hunting upon cultivated or inclosed land." Under section 2549 of the code, cities, towns, and counties have the right to condemn property and build dams across the outlet of any lake in their county both for the purpose of keeping the water to the ordinary level of the lake and to prevent the escape of fish. In many cases this has been done, the water thus being brought back to the ordinary level, with the result that some of the shore line as it was in low water has been covered. Your warden finds that in several cases the dams have been blown up and in others torn down. While this matter does not technically come under my duties as warden, yet the destruction of the fish placed in these waters at the expense of the state compels me to take notice of the same. Could the meandered lines of these lake be remeandered and permanent posts set, the trouble could be avoided. I would recommend that an appropriation be made for the purpose of defining the lines of the different lakes and making the same permanent. The following is a list of Iowa's meandered lakes, showing the extent of the interests involved and the necessity for some action:



WHITE OR SILVER BASS (*Morone chrysops*).



THE CRAPPIE (*Pomoxis annularis*.)

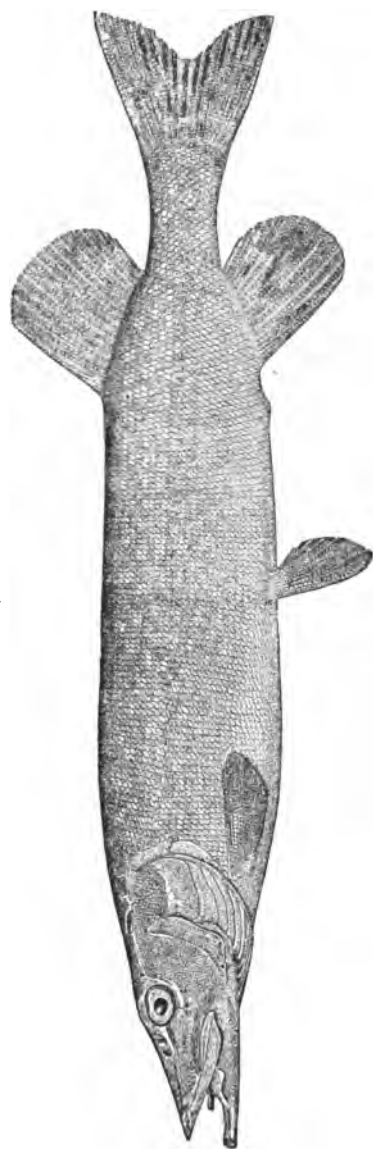
IOWA'S MEANDERED LAKES.

A statement of the meandered lakes of Iowa, their locality, area and shore line, as shown by the meander notes of the government survey of same.

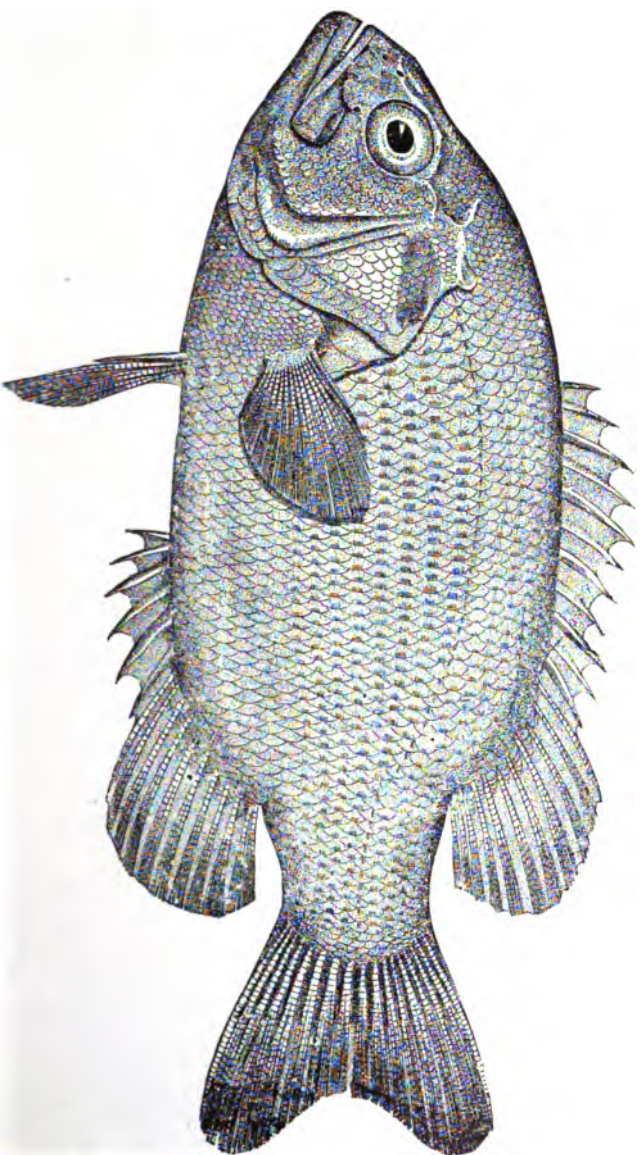
LAKE.	LOCALITY OF LAKES.			Estimated area in acres.	ESTIMATED SHORE LINE.		
	Township.	Range.	COUNTY.		Miles.	Chains.	Links.
*Goose lake, in sections 28, 29, 32 and 33.....	N 83	E 5	Clinton	301.55	2	65	48
Muscataine slough, in sections 7, 17, 18, 20, 21, 28 and 29.....	74	W	Louisia	570.00	19	31	40
Clum lake	75	2 and 3	Louisia	152.00	8	15	11½
Green bayou, in sections 26, 27, 28, 29, 31, 32 and 33.....	68	2 and 3	Lee	271.00	8	48	37
Keokuk lake, in sections 13, 22, 23, 24, 26 and 27.....	76	3	Muscatine	454.00	5	26	33
Lake in sections 1 and 2.....	96	3	Allamakee	163.86	2	50	68
Lake in sections 16, 20 and 21.....	88	4	Delaware	44.25	1	52	27
Two lakes in sections 13, 24 and 25.....	100	4	Allamakee	200.00	3	33	33
Swan lake	80 and 81	7	Johnson	45.00	1	10	55
Lake in sections 4, 5, 8, 9, 16 and 17.....	99	3	Allamakee	679.00	6	16	39
Lake in sections 30 and 31.....	81	7	Johnson	62.73	2	6	6
Clear lake	96	22	Cerro Gordo	3,643.37	31	35	42
Lake Rice	99	22 and 23	Worth and Winnebago	600.00	2	56	75
Silver lake, in sections 14 and 15.....	100	22	Worth	318.00	4	8	95
Bright's lake, in sections 7, 8 and 17.....	100	22	Worth	185.00	2	18	50
Iowa lake, in sections 14, 15, 22, 23, 24, 25 and 26.....	88	23	Hamilton	886.84	6	24	13
Wall lake, in sections 9, 10, 15 and 16.....	86	24	Hamilton	304.56	2	67	55
Lake in section 27.....	87	24	Hamilton	142.00	2	1	55
Cairo lake	87	24 and 25	Hamilton	1,382.85	8	53	43
Walled lake, in sections 2, 10, 11, 14 and 15.....	90	24	Wright	986.85	5	73	91
Cornelia lake, in sections 9 and 16.....	92	24	Wright	332.42	7	71	97
Erim lake, in sections 21, 22, 27 and 28.....	92	24	Wright	450.38	1	67	32
Twin lake, in sections 28 and 29.....	93	24	Wright	107.07	1	3	20
Lake, in sections 19, 20, 29 and 30.....	94	24	Hancock	103.00	3	4	4
Lake.....	96	24 and 25	Hancock	106.00	5	22	84
Lake.....	96	24 and 25	Hancock	915.00	5	22	84
Duck lake, in sections 20 and 21.....	100	24	Winnebago	71.30	1	27	40
Lake, in se qr of section 24.....	96	25	Hancock	59.00	1	7	47
Lake, in sections 9, 10, 15 and 16.....	97	25	Hancock	252.68	2	63	13
†Impassable marsh.....	91 and 92	27	Humboldt	1,743.20	9	22	15

IOWA'S MEANDERED LAKES—CONTINUED.

LAKE.	LOCALITY OF LAKE.			Estimated area in acres.	ESTIMATED SHORE LINE.		
	Township	Range.	COUNTY.		Miles.	Chains.	Links.
Owl lake, in sections 21, 22, 27 and 28.	90 and 91	27	Humboldt	772.14	4	60	.....
Lake	91	29	Webster and Humboldt	211.00	4	60	.....
Bass lake	100	29 and 30	Humboldt	208.00	2	60	87
Bancroft lake, in sections 10, 14 and 15	84	29	Kossuth	195.00	2	60	79
Lake	100	30 and 31	Greene	715.00	1	60	73
Lake, in section 17	100	30	Kossuth	76.43	1	35	.....
Lake, in sections 28	100	30	Kossuth	147.40	2	40	.....
Lake, in sections 9 and 10	100	30	Kossuth	48.00	1	2	.....
Lizard lake, in sections 22 and 27	91	30	Pocahontas	254.38	2	75	75
Iowa lake, in sections 11, 12 and 14	100	31	Emmet	285.00	2	75	75
Walled lake	100	31	Emmet	571.00	2	42	75
Lake (medium)	88 and 89	32 and 33	Calhoun	986.00	12	34	51
Swan lake (seven or eight miles long)	66 and 67	32 and 33	Palo Alto	2,300.00	12	57	21
Lake Okoboji, in sections 10, 11 and 12	99	32	Emmet	945.00	22	30	70
Tremont lake	100	32	Emmet	147.00	.....	10	6
Lake, in section 10	86	33	Emmet	166.84	2	3	79
Lake, in sections 1, 2, 11 and 12	88	33	Calhoun	490.00	2	41	59
High lake, in sections 11, 12 and 13	98	33	Emmet	461.20	4	43	.....
Lake, in sections 14, 15 and 23	98	33	Emmet	337.00	3	70	29
Swan lake, in sections 27, 28, 33 and 34	99	33	Emmet	442.28	4	40	.....
Lake, in sections 16 and 17	100	33	Emmet	177.20	5	2	62
Tow Head lake, in sections 23 and 24	89	34	Emmet	195.05	8	16	6
Clear lake	91 and 92	34	Calhoun	170.00	2	62	28
Two lakes, in sections 9, 15, 16 and 17	93	34	Pocahontas	616.00	7	15	20
Rush lake, in sections 20 and 21	94	34	Palo Alto	501.15	4	1	23
Silver lake, in sections 18, 19, 21, 28 and 29	95	34	Palo Alto	656.00	4	71	30
Lake, in sections 29 and 30	96	34	Palo Alto	192.57	5	29	35
Lake, in sections 16, 17, 19, 20 and 21	96	34	Palo Alto	458.42	7	.....	.....
Eagle lake, in sections 11, 14 and 23	100	34	Emmet	3,495.00	28	3	15
Lost Island and Pelican lakes	96 and 97	35 and 36	Palo Alto and Clay	1,773.00	3	27	23
Trumbull lake	95 and 97	35	Clay	3,009.95	3	74	16
Twelve Mile lake, in sections 20, 21 and 29	98	35	Emmet	316.43	1	66	32
Cheever lake, in sections 20, 21 and 29	99	35	Emmet	219.00	1	48	31
Lake	99	34 and 35	Emmet and Dickinson	216.19	1	26	5
Lard lake, in sections 4, 5, 8 and 9	89	35	Sac	63.60	1	.....	.....
Rush lake, in sections 8 and 17	89	35	Sac	172.97	2	.....	.....
Lake	93 and 94	35	Buena Vista and Clay	.....	.....	.....	.....



THE PIKE (*Esox lucius*).



THE ROCK BASS OR RED EYE (*Ambloplites rupestris*).

Figure 1 consists of four diagrams labeled (a) through (d), illustrating the evolution of a 1D lattice system. Each diagram shows a horizontal line representing a lattice with discrete sites. (a) shows a single site with a spin-1/2 particle. (b) shows two sites with a spin-1/2 particle and a spin-1/2 particle. (c) shows two sites with a spin-1/2 particle and a spin-1/2 particle. (d) shows two sites with a spin-1/2 particle and a spin-1/2 particle.

Lake, in sections 25 and 26	94	15	Clay	235.23	2	22	62
Lake, in sections 8, 9, 16, 17 and 20	95 and 96	35	Clay	300.00	1	34	95
Lake, in sections 7 and 18	97	35	Clay	219.00	4	10	97
Lake	99	35	Dickinson	187.00	1	63	.....
Lake, in sections 22, 23, 26 and 27	100	35 and 36	Dickinson	110.00	2	7	75
Wail lake	100	35	Dickinson	375.15	4	38	73
Spirit lake	109	36	Sac	907.00	9	30	20
Okeboh, east	99 and 100	36	Dickinson	5,100.10	23	73	86
Okeboh, west	99	36	Dickinson	1,842.00	9	.....	.....
Gar lakes, in sections 29, 30 and 32	99 and 100	36	Dickinson	3,993.00	38	38	7
Two lakes	99	36	Dickinson	460.00	.....	.....	.....
Lake, in sections 5, 6, 7 and 8	99	36	Dickinson	194.00	3	32	84
Lake, in section 23	99	36	Dickinson	293.42	3	7	85
Lakes (four), just west of Spirit lake	100	36	Dickinson	136.37	2	1	20
Storm lake	99	36	Dickinson	900.00	12	25	25
Lake, in sections 31 and 32	99	37	Buena Vista	3,224.47	9	61	67
Lake, in sections 30 and 31	99	37	Dickinson	143.00	3	12	24
Diamond lake, in sections 10, 11, 14 and 15	100	37	Dickinson	157.40	2	62	24
Lake, in sections 23, 24, 25 and 26	100	37	Dickinson	164.55	2	4	15
Lake	100	36 and 37	Dickinson	70.90	1	24	20
Silver lake, in sections 27, 28, 29, 32, 33 and 34	100	37	Dickinson	50.00	1	14	21
Lake on Minnesota state line	100	39	Dickinson	1,047.40	6	41	79
Rush lake	100	39	Osceola	165.90	2	1	70
Wabonise lake, in sections 2 and 3	70	39 and 40	Fremont	357.53	3	33	61
Lake, in sections 29 and 32	74	43	Pottawattamie	260.00	1	67	38
Lake, in sections 11, 14, 15, 22 and 23	75	43	Pottawattamie	72.48	1	53	50
Lake, in sections 2, 3, 10 and 11	75	44	Pottawattamie	430.79	1	6	39
Boyer lake, in sections 21, 22, 27 and 28	76	44	Pottawattamie	234.63	4	19	77
Lake	76	44	Pottawattamie and Harrison	593.00	5	10	25
Lake, in section 22, 23 and 26 (Soldier)	77 and 78	45	Harrison	76.78	2	4	85
Lake, in sections 2, 11, 14, 15, 22 and 27	78	45	Harrison	266.91	4	48	99
Lake, in sections 13, 14, 23 and 24	80	45	Harrison	532.00	4	.....	20
Blue Lake	80	45 and 46	Monona	416.88	3	25	69
Lake, in sections 10, 11, 12, 13, 14, 23, 24, 26, 27 and 34	83 and 84	47	Woodbury	1,598.60	10	28	63
	86	47	Woodbury	991.27	13	8	59

*Goose Lake, in Clinton county, was drained, surveyed, and approved as swamp land, and patented to the county as swamp land, October 7, 1886.
 †The "Impassable Marsh," in Humboldt, has been surveyed, approved, and patented to the state as swamp land, and patented by the state to Humboldt county.

ESTIMATE OF FUNDS NECESSARY FOR 1902 AND 1903.

For protection, distribution, and reproducing fish for two years..	\$ 4,000.00
For payment of deputy fish wardens.....	3,000.00
For payment of deputy game wardens	1,000.00
For assistant's salary.....	500.00
For gathering fish at Sabula for the purpose of restocking rivers and lakes.....	4,000.00
For railway transportation, fish car.....	1,000.00
For protection of game.....	2,500.00
	<u>\$16,000.00</u>

RECEIPTS AND EXPENDITURES.

The last biennial report gave the exhibit of receipts and expenditures from April 1, 1898, to November 30, 1899. The balance of the expenditures for the fiscal year ending March 31, 1900, is as follows:

EXPENDITURES.

December, 1899.....	\$ 363.43
January, 1900.....	141.27
February, 1900.....	136.13
March, 1900.....	724.40

\$ 1,365.23

Amount accounted for in reports of 1898 and 1899..... 6,724.47

\$ 8,089.70

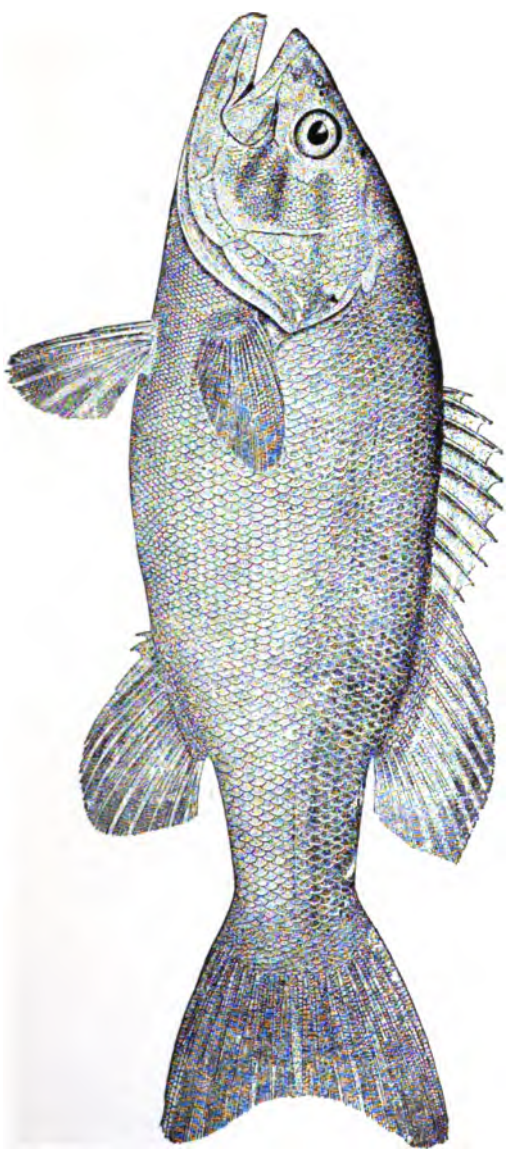
Appropriation by the Twenty-eighth general assembly.. \$15,000.00

EXPENDITURES.

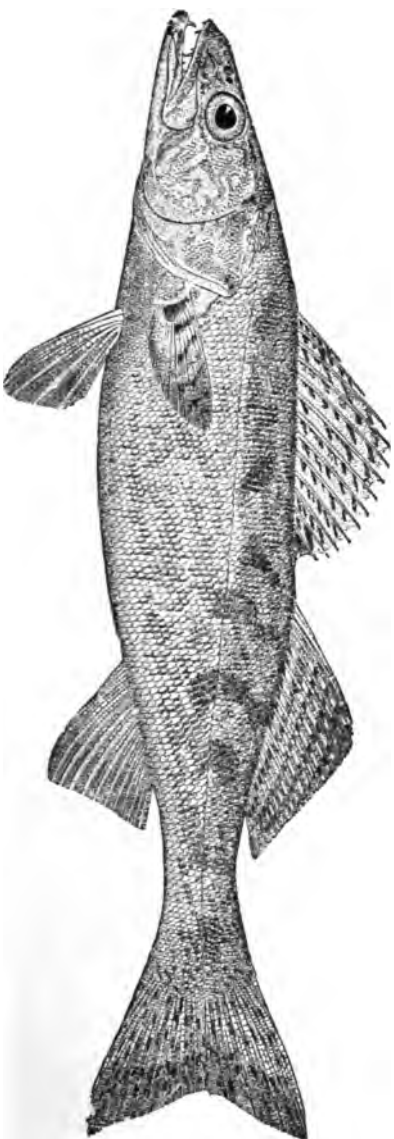
April, 1900	277.91
May, 1900.....	401.50
June, 1900.....	238.04
July, 1900.....	754.69
August, 1900.....	714.76
September, 1900 ..	275.92
October, 1900	286.61
November, 1900.....	281.32
December, 1900.....	178.19

EXPENDITURES.

January, 1901.....	\$ 86.32
February, 1901.....	85.38
March, 1901.....	145.37



THE SMALL-MOUTH BLACK BASS (*Micropterus dolomieu*).



THE WALL-EYED PIKE (*Stizostedion vitreum*)

April, 1901.....	323.02
May, 1901.....	288.95
June, 1901.....	229.51
July, 1901.....	434.49
August, 1901.....	537.95
September, 1901.....	474.68
October, 1901.....	1,211.89

Total	\$ 7,226.50
Balance undrawn.....	\$ 7,773.50

An itemized report may be found on file with the auditor of state. The unexpended balance shown above is largely on account of the retarding of the work at Sabula in the fall of 1900 by high water in the Mississippi. While, as before, noted, only one car-load of fish was shipped during that year, in the ordinary good season there should be placed not less than twenty to twenty-five carloads of food fish in the various interior waters of the state.

**DISTRIBUTION OF FISH FROM SABULA BY STATE FISH CAR
"HAWKEYE."**

1900.

Spirit Lake at Orleans.

1901.

Turkey river at Elkader.
Des Moines river at Ottumwa.
Raccoon river at Perry.
Clear lake at Clear Lake.
Nodaway river at Corning.
Wall lake at Lake View.
Des Moines river at Humboldt
Maquoketa river at Maquoketa.
Storm lake at Storm Lake.
Spirit lake at Orleans.
Boone river at Webster City.
Turkey river at Elgin.
Turkey river at West Union.
Okoboji lake at Okoboji.
Wapsie river at Independence.

Each of the above places has been visited by the fish-car, and except Independence, furnished by courtesy of United States fish car a full load, consisting of black, silver and rock bass, crappie, pike, pickerel, catfish, perch, and sunfish has been deposited in the lakes and rivers. The car in this work has made mileage of over 8,000 miles.

WARDEN NO AUTHORITY TO FURNISH FISH TO PRIVATE PARTIES.

On a former page of this report reference has been made to the advisability of furnishing fish to stock private ponds. In order that this may be done there will have to be some action taken by the legislature, since by a recent decision of the supreme court, in the case of the State of Iowa against Fred Sears, appellant, from Sac county (opinion hereinafter given in full), your warden is prevented from furnishing fish of any kind for food, propagation, or other purposes to private parties. In many cases private individuals, at a large expense, have built ponds on their grounds for the purpose of raising food-fish, and your warden has considered it a part of his duties to supply fish to these parties, believing that as the United States, and most of the states of the Union other than Iowa, foster this kind of industry among its people, whereby they can raise their own food-fish, and also understanding that this was the intent of our own state law, had promised many parties shipments of fish this fall. Under this decision, these promises can not be lawfully kept. I would recommend that the law be so amended that your warden will have the power to furnish private parties with fish as hereinbefore indicated.

The following is the text of the decision in full:

STATE OF IOWA vs. FRED SEARS, Appellant.

(Appeal from the District Court of Sac County.)

S. M. ELWOOD, Judge.

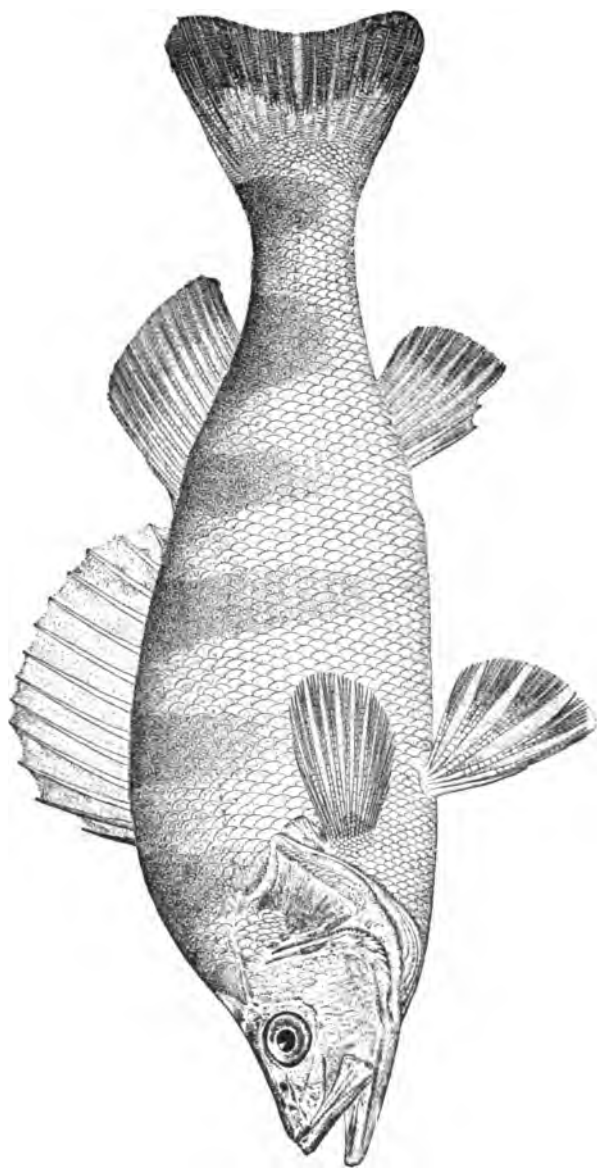
The defendant was accused and convicted in (Justice) Court of catching ten young pickerel with a seine from Wall Lake. Upon appeal to the district court, it was admitted the fish were caught in the manner alleged, but by virtue of the following permit signed by the state fish and game warden: "By the power invested in me as fish and game warden of the state of Iowa, I hereby grant Mr. Fred Sears the privilege of drawing a seine in the public waters of the state, for the purpose of seining some young game-fish for his pond, and no other purpose whatever. This permit to expire November 15, 1898."

GEORGE E. DELAVAN.

This was adjudged to be in excess of that officer's authority and to afford no protection. The defendant appeals from judgment imposing statutory penalties.

HASTINGS & BRASTED and WILL E. JOHNSTON, for appellant,
MILES W. NEWBY, for appellee.

LADD, J.—Unless the fish and game warden of the state had authority to permit citizens to take fish from public waters with a seine to stock private ponds, the defendant was properly convicted. By section 2546 of the code: "The warden may take from any of the public waters of the state, at any time and in any manner, any fish for the purpose of propagating or restock-



YELLOW PERCH (*Perca flavescens*)

ing other waters, or exchanging with fish commissioners of other states or of the United States."

The accepted canons of construction limit the words "other waters" to the kind previously mentioned, i. e., public waters. Some of a designated class having been spoken of, others must be presumed to have reference to those of the like kind. But a different construction is said to have been given this statute in usage for many years. An examination of the record does not sustain this claim. The particular provision first appeared in Chapter 34 of the acts of the Twenty-third General Assembly, reading: "It shall be lawful for the state fish commissioner to take from any of the public waters in any manner any fish for the purpose of propagation or restocking other waters." Up to that time the removal of fish from some of the streams and lakes of the state to restock others was not contemplated by any of the legislation on the subject. Thus the object stated in chapter 50 of the acts of the Fifteenth General Assembly was, "to forward the restoration of fish to the rivers and waters of this state." Chapter 70 of the acts of the Sixteenth General Assembly directed the distribution of the fish produced in the hatchery only. By chapter 80 of the acts of the Seventeenth General Assembly it was made the duty of the fish commissioner, "to forward the restoration of fish to the rivers and waters of the state and to stock the same with fish from said hatching-house and elsewhere." "Elsewhere" as here used cannot have meant from the very rivers and waters proposed to be restocked. Certainly no authority has ever been given this officer to remove fish from the very waters it was his duty to restock and give to private parties. Nor is there any showing that such has ever been the practice of the fish commissioner. Whether he may distribute fry from the hatchery to owners of private ponds is a different question and not now before us. It may be remarked, however, that his authority to do this, under the present code, is at least doubtful. As the fish and game warden had no authority himself to take fish from the public waters for private ponds he could not empower the defendant to do so. The information in charging the acts of defendant to have been unlawful negated the suggestion that he may have been taking the fish for some lawful purpose.

Affirmed.

ARRESTS AND PROSECUTIONS.

During the period between April 1 and August 30, 1901, arrests have been made, parties fined, and seines, spears, and other illegal devices destroyed or forfeited to the state in the following counties:

Buena Vista	Jefferson	Polk
Woodbury	Van Buren	Monona
Pottawattamie	Dickinson	Scott
Jackson	Palo Alto	Boone
Howard	Kossuth	Lee
Marshall	Lyon	Floyd
Clinton	Cherokee	Calhoun
Winneeshiek	Harrison	Jasper
Cerro Gordo	Chickasaw	Butler
Wright	Greene	Sac
Humboldt	Page	Iowa
Debuque	Grundy	

BONAPARTE DAM.

With respect to the dam obstructing the Des Moines river at Bonaparte, my predecessor co-operated in the attempt made by legal proceedings to secure a fishway, but the results of litigation have been adverse to the state, and the recent decision of the supreme court recognizes in the owners of the dam the absolute right to forever maintain it without fishways. The people of the state are powerless to obtain any relief through the courts; they must rely upon the legislature, and, in view of the fact that a vested right to maintain the dam without fishways is established as a result of the decision referred to, the only means available under the law, as announced, is appropriate legislation authorizing the purchase or acquisition of a property by condemnation proceedings. So large a part of the state is affected, and the available supply of fish so greatly depleted by the obstruction of the river, that the matter is of very great public concern. I therefore recommend legislation authorizing the purchase or condemnation of the dam, as the only adequate means of restoring to the people of the state the benefits otherwise denied to them.

ACKNOWLEDGMENTS.

To the League of American Sportsmen, which has a large number of members in this state, and which was active in securing the enactment of the Lacey game law, I wish to extend thanks for the assistance that has been given me through its membership in preventing the slaughter of game-birds, and also for its good work, successfully done, in cultivating public sentiment for the better enforcement of the laws. I feel grateful, also, to the numerous fish and gun clubs that have rendered much valuable assistance in unearthing violations of the law and which have rendered it possible for me to obtain in many cases evidence sufficient to secure convictions. Finally, I wish to thank the press of the state, which has at all times assisted me in every way to uphold the laws, and whose utterances have tended to increase public interest in the protection of our fish and game. In our work we have no better friends than the railroad managers of the various lines in the state. They have proven their interest in many practical ways and have placed me under many lasting obligations.

Respectfully submitted,

GEO. A. LINCOLN,

Fish and Game Warden.

NINTH BIENNIAL REPORT

OF THE

Bureau of Labor Statistics

FOR THE

STATE OF IOWA

1899-1900

C. F. WENNERSTRUM
COMMISSIONER



DES MOINES:
B. MURPHY, STATE PRINTER.
1901.



LETTER OF TRANSMITTAL.

STATE OF IOWA, }
BUREAU OF LABOR STATISTICS. }

DES MOINES, Oct. 1, 1901.

To the Governor :

SIR.—I have the honor to transmit herewith for your consideration the Ninth Biennial Report of the Bureau of Labor Statistics for the years 1899 and 1900.

The work of the bureau has been rather varied in character. Inspection of factories in the state has absorbed a great deal of the time and energy of the chief and his deputy. I personally investigated 276 factories and my deputy, Mr. Holder, 52. With the results of our investigations I will deal at length in a later connection. Another important undertaking was the investigation of the strikes that have occurred in Iowa in the past six years, beginning in July, 1894, up to and including 1900. In addition to the just mentioned undertakings, the bureau has compiled statistics relative to the wage-earners of Iowa, showing nativity, wages, nature of occupation, etc.; and also statistics of the organizations of labor unions. Besides this we have made an investigation of the movements for an eight-hour labor day as it affects labor generally, also the progress of manual training in Iowa schools, the development of co-operative undertakings in Iowa, and profit-sharing in adjacent states.

My original plans for this report included the results of another statistical inquiry relative to the effect on our manufacturing, commercial, and labor interests in Iowa of the employment of the convicts in our state penitentiaries. It is a subject that has been under much popular discussion and legislative consideration during the past three or four years; but lack of time and means with which to prosecute the inquiries prevented the bureau going into the matter as it most certainly should be gone into. The employment of convict labor has been the cause of much

complaint on the part of labor, and manufacturing and commercial interests, throughout the country, and there is marked opposition to the employment of the convicts in this state where their product comes in competition with free labor. For the most part the opposition to convict labor is, in my opinion, justified; but it is not possible, nor would it be proper for me prior to such an investigation as I had hoped to make, to say to just what extent and in what directions Iowa industry and labor are injuriously affected by the employment of the state's convicts at the penitentiaries.

I had also planned to investigate fully to what extent ordinary business pursuits are followed on the first day of the week, commonly called Sunday, and which is described in the Code, section 5040, as "Breach of Sabbath," but reasons given in the preceding paragraph prevented the inquiry in this case as well. The conducting of business on Sunday is an injustice to the employees who are thus compelled to forego one day's rest each week, and a wrong to the business man who faithfully observes the Sabbath, giving him one day less of business each week than the man who transacts business seven days in the week. The reasons for Sabbath observance are so obvious that I need hardly say more on the subject.

The bureau was fortunate in being able to secure the results of investigations into certain phases of industrial life undertaken by students of those questions. One of these is found in Part II. of this report and is a monograph entitled "Some of the Economic and Industrial Phases of the Amana Society, or Community of True Inspiration," by Mrs. Bertha Horack Shambaugh of Iowa City. The investigation was undertaken by Mrs. Shambaugh at my suggestion and urgent request. I had spent nearly three days at the Amanas, personally investigating the practical workings of this remarkably interesting communistic experiment, which has been in progress in that unique community for forty-six years. I found, however, that I was unable to secure all of the data that was desirable, and learning that Mrs. Shambaugh had an acquaintance with the community, having written a number of short studies showing the sociological and religious life of the members of the society, I asked her to prepare the monograph for this report. This deals almost entirely with the industrial phases of this interesting communistic society, which has achieved such notable success in Iowa county. Following Mrs. Shambaugh's study is a paper by another Iowa student of

social economics, Miss Kate B. Miller of Indianola, who has investigated the subject of free employment-offices in the United States. She began the investigation on her own initiative, but came to the Bureau for assistance, which has been given her as much as our time and means allowed, in return for which she has kindly consented to the publication of the results of her work in this report. Following Miss Miller's paper is a short sketch of the Icarian Colony (now extinct) in Adams county. Personal investigations were made, and the statements as we have them from the press were verified in every particular.

In Part II. will also be found four articles upon subjects of statistics, education, labor and trade, which I deem of sufficient importance to reprint in this report. The first is a monograph by the Hon. Carroll D. Wright, United States commissioner of labor at Washington, on "The Influence and Value of Labor Statistics." The second is an interesting and instructive paper upon "The Kindergarten as an Educational Force," delivered by Prof. Francis E. Cook, principal of the Wayman Crow school of St. Louis, before a convention of officials of bureau of labor statistics, which convened in St. Louis, May 23d, 1901. The author discusses this primary educational work entirely from an industrial point of view. The third paper is by Dr. Calvin Milton Woodward, of Washington University, of St. Louis, on "Manual Training vs. Trades Schools," delivered before the same convention. The writer lays great emphasis upon the thought that manual training is of vital importance to laboring men, and should be sought for as a means of increasing their industrial capacity. The fourth and last of these reprints is the paper by Hon. Carroll D. Wright, United States commissioner of labor, on "The Workings of the Department of Labor" at Washington, D. C.

The demands on the Bureau for statistical information have increased very materially since I entered upon the duties of the office, so much so as to trench very seriously upon the time of the office force. Such demand upon the part of the public is entirely, legitimate and is no matter for complaint. On the contrary it is a cause for congratulation: as it indicates the interest taken in problems concerning which the bureau was especially created to furnish information.

The work of the bureau is fully indicated in the tabular statements included in this report. I deem it my duty, however, to indicate, in briefer form than is possible in the general report of

the office, the results of the various activities of the Bureau during the past two years, and the lessons which they teach, and to urge upon you to recommend certain changes in the law affecting the requirements and the statutes regulating the trades and industries of the state as they affect employers and employees.

I.

FACTORY INSPECTION.

The most important work of the Bureau during the past two years has been the inspection of factories and industrial establishments throughout the state with a view to ascertaining the sanitary conditions of such establishments, the means employed for protecting workmen from fires and dangerous machinery, and the employment of children. This investigation has been practically an innovation in the undertakings of the Bureau. My predecessor pointed out the serious needs of factory inspection, and urged legislation to this end.

The statute governing the work of the Bureau (sec. 3472 of the Code of 1897) provides that the Commissioner of the Bureau of Labor Statistics shall have the power, "upon the complaint of two or more persons, or upon his failure to otherwise obtain information in accordance with the provisions of this act," to enter any factory. Realizing that from the nature of the case it would be practically impossible to secure reliable and satisfactory information respecting conditions of labor within the factories of the state by correspondence and solicitation, I called upon the Attorney-General, in a letter under date of June 8, 1900, asking his official opinion as to the right and power of the Commissioner of Labor under the aforesaid section. Hon. Milton Remley, in an opinion rendered June 11th, declared that in his opinion the Commissioner of Labor was fully empowered under said section to enter any and all factories for the purpose of securing information relative to such matters as the escape of employes in case of fire, means of preventing accidents, ventilation of buildings, etc. The Attorney General's opinion is so important that I present his letter below:

"OFFICE OF ATTORNEY-GENERAL.

DES MOINES, IOWA, June 11, 1900.

C. F. WENNERSTRUM,

Commissioner of Labor Statistics, Des Moines, Iowa.

DEAR SIR:—Yours of the eighth duly to hand, in which you refer to sec-

tion 2472 of the Code and ask: "Must the Commissioner first obtain or secure the complaint of two or more persons before he can enter such factory, or does the law mean that he must make an examination of a factory on receiving such complaint, and does the law quoted authorize him to make an examination on his own initiative after having first asked permission in writing to inspect such factory, as the law prescribes?"

The language of the statute is: "The Commissioner of the Bureau of Labor Statistics shall have the power, upon the complaint of two or more persons, or upon his failure to otherwise obtain information in accordance with the provisions of this act, to enter any factory, mill, etc., when the same is open or in operation, upon a request being made in writing, for the purpose of gathering facts and statistics such as are contemplated by this act." Section 2474 of the Code provides, in general terms, the kind of information that may be required to be furnished by the owners or managers of such factories, mills, workshops, mines, etc. The information given may not prove satisfactory. Some matters about which information is to be asked, such as, what means are provided for the escape of employes in case of fire; what measures are taken to prevent accidents to employes from machinery; how are the buildings ventilated, etc.; could be obtained better by a personal inspection, which could be given. The purpose of the law, among other things, is unquestionably to secure the best possible protection for the life and the health of the employes. A power often implies a duty. Where complaint is made by employes or others, as to the insufficiency of the appliances to secure the life, health, and comfort of the employes, I think it is the duty of the Commissioner to make a personal inspection, exercising thereby the powers to enter the building, when it is open or in operation, after making a request therefor in writing. But, if for any cause, he deems the information which he has obtained not satisfactory, I do not think he is limited in his action until after complaint is filed. He may make request in writing, and if granted enter the building, and if refused permission he may proceed to enter the building without the consent of the owner.

Yours respectfully,

(Signed) MILTON REMLEY,

Attorney General.

Fortified with this opinion of the law officer of the state, I proceeded to investigate all factories in the state so far as my time and means would allow. The greater part of the latter five months of 1900 was spent in such inspection, and some inspections were made in January and February of this year. We confined our investigations to establishments in towns of 5,000 and over, as a rule. In several instances, however, we visited factories in the smaller towns and cities. The total number investigated aggregated three hundred and twenty-eight. It is but fair to state that I visited probably one hundred or more small institutions where one or two and sometimes three persons were employed, but I have not included them in table No. 1 of this

report, wherein the reports of my investigations are set out in detail.

The results of the labors of the Bureau in this new work of factory inspection have amply justified the new departure, and I shall indicate to you the conditions which I discovered to exist, and shall urge upon you to recommend such legislation as these conditions demand for the protection of Iowa's laboring population in the matter of health, comfort and morals.

IOWA AS A MANUFACTURING STATE.

It is a widely prevalent opinion that Iowa is an agricultural state; that our citizens devote themselves almost entirely to the industries of the farm and garden. The notion, however, is very far from being true. The urban population of Iowa, as shown by the census of 1900, is 975,641, nearly one-half of the population of the state. There are sixty-four towns in Iowa possessing 2,000 or more inhabitants, and six with populations exceeding 25,000. In these towns and cities are to be found factories and manufacturing establishments to the number of at least 14,819, according to the enumeration of 1900, wherein there were 58,553 persons employed. There is a large number of factories in which 500 people are congregated and the largest establishment had 1,100 persons on its pay roll. The amount of capital represented in these factories aggregated \$102,733,103. The amount of wages paid in 1900 footed up to \$23,931,680. The value of the products turned out by Iowa factories last year reached the sum of \$164,617,877.

It is nothing less than astonishing that, with such a very considerable population devoted to manufacturing, Iowa is among the very few states without statutory regulations and inspection of the employment of men, women, and children within the factories of the state. While it is but fair to say that on the whole the conditions of industrial employment in Iowa are fairly satisfactory, nevertheless many of the conditions found in large numbers of factories are dangerous, to say the least, and intolerable in numerous instances. Out of 290 factories with two or more stories, which were visited, there were only twenty with fire escapes. The sanitary conditions prevailing in large numbers of factories were exceedingly dangerous to the health of the employe and to the community in which the factory was located. The arrangements respecting closets and urinals were generally defective in the extreme. With the exception of some of the

larger establishments, which I take pleasure in saying are generally to be commended for more considerate treatment of their workmen than the smaller factories, there are few if any adequate measures taken for protecting employes from dangerous machinery. Many of these conditions of which complaint is justly made have come about through developments in our industries that were not easily foreseen by parties responsible therefor, and not always, by any means, to their discredit. For example, a good mechanic years ago began the making of some useful article and because of its great merit the business of making it grew until it required a large establishment to manufacture it, but the owner or manufacturer from time to time added building to building, and employed more men, with the result that unsanitary conditions were imperceptibly produced, due to no conscious negligence of the owner of the premises. Notwithstanding, with the change of times and circumstances such a factory should be subject to state inspection to secure healthful conditions and protection for employes. It would seem to be right and proper that I give the names of owners or managers of factories where the conditions are unsafe or intolerable as is done by the inspectors in many states of the Union, but under our law as it is now it is not proper for me to expose by name and specification the factories visited by me. The Attorney-General's opinion follows:

STATE OF IOWA,

OFFICE OF ATTORNEY GENERAL.

To C. F. WENNERSTRUM,

Commissioner Bureau of Labor Statistics.

SIR—You ask our opinion as to whether the information, obtained through inspection provided for in section 2472 of the Code, is such information as is deemed confidential, and the publication of the names of individuals, firms, or corporations is prohibited by section 2475 of the Code.

Our answer to this inquiry must be in the negative. In order to answer this question intelligently, it is necessary that we consider the entire chapter 8, relative to the creation and duties of the commissioner of labor statistics.

Section 2470 defines the duties of the commissioner, and specifies the kind and class of information which it is his duty to collect, assort, systematize, and present in his report to the governor.

Section 2474 provides that such information shall be furnished upon request of the commissioner.

Section 2471 vests the commissioner with power to secure such information, when not otherwise furnished, by the issuance of subpoenas, administering oaths and taking testimony of witnesses.

Section 2472 also furnishes another means of obtaining such information,

where the commissioner is unable to procure the same under section 2474 or 2471.

Neither of the last above mentioned sections provides for any other class of information to be obtained by the commissioner than that specified in section 2470. This last mentioned section enumerates and specifies all of the information which the commissioner is required to collect, assort, systematize, and present in his report.

Sections 2471, 2472, and 2474 only provide the means, or vests the commissioner with certain powers, by which he may obtain such information.

Section 2475 clearly prohibits the use of the names of individuals, firms, or corporations, in supplying information called for by sections 2470 and 2471.

It certainly could not have been the intent of the legislature to permit the use of confidential information obtained by the means provided in section 2472, and prohibit its use when obtained either under section 2474 or 2471.

The real purpose and intention of the legislature in prohibiting the use of information is because the same is in its nature deemed confidential. Such information is as much confidential information, when obtained under the power vested in the commissioner by section 2472, as it would be if obtained by either of the other methods.

We, therefore, are clearly of the opinion that no use should be made of names of individuals, firms, or corporations supplying the information obtained under the authority vested in the commissioner by section 2472.

Respectfully submitted this 22nd day of July, 1901.

CHAS. A. VAN VLECK,
Ass't. Att'y. Gen.

THE NEED OF FACTORY INSPECTION.

It is not necessary for me to explain or argue for the need of adequate regulation and inspection of the conditions of labor and employment in factories. The people of Iowa have long pursued such a policy with respect to the mining industry, where energetic measures are taken to guard the workers underneath the ground from fire damp, defective shafts and poor ventilation. In a word, we strive to secure safety to the worker and such protection from adverse conditions as is possible for the state to secure for him. We have instituted a Board of Health, a Pharmacy Commission, a Dairy Commission, whose duties consist in the protection of the people from unsanitary conditions, from dangerous articles of commerce and from the transmission of disease through the sale of impure products. The legislation providing for such investigation and regulation is simply the exercise of the police power of the state government, resorted to for the common benefit of the general public. And it is with this in view that I urge upon your consideration the necessity

for more complete supervision of industrial establishments, to the end that the conditions of labor may be improved and men, women and children be protected from unhealthful and dangerous surroundings and the community guarded against diseases which the unsanitary conditions now prevailing may easily promote. In order that you may realize fully the serious nature of the evils resulting from lack of proper inspection of factories by the state, I shall set out briefly some of the more striking results of our investigations, the details of which will be found in table No. 1.

I.—SANITARY CONDITIONS.

The preservation of health is almost the first law of society; and sound bodies, steady hands and clear minds are the fundamental necessities of successful industry. The successes of the American mechanic and of the American employer of labor have been due primarily to the fact that his employes have been men with strong bodies and clear minds, whose energies and faculties have not been sapped or undermined by unhealthy or degrading conditions. It needs no argument to demonstrate to you that employes render better services in healthful workrooms, where ventilation, drainage, heat and light are satisfactorily provided, than they can do in crowded quarters, where a foul and overheated atmosphere depresses and deadens their energies and stupefies their faculties. Regarded simply from an economic point of view it is eminently wise to enforce strict regulations respecting the drainage and ventilation of workrooms and insist upon suitable provisions for the general health of employes.

(a) WATER-CLOSETS.

One of the most urgent needs in Iowa factories at the present time is the provision for suitable facilities in the way of water-closets and urinals. The Commissioner found in his investigation that nearly thirty-seven per cent. of the establishments visited were without decent closets or even places wherein men could properly attend to their physical needs. In one city which I visited two establishments where both sexes were employed had only one closet in each establishment, and in neither case were they provided with locks. In one (see Inspection No. 93 of table No. 1) forty women and twenty-three men were employed at the time of the inspection. In the other, ten men and five women. The proprietor of one of the establishments, when I complained

of the fact of only one closet, attempted to palliate the matter by claiming that his forces were like the various members of a family, and that there was not any sense or reason in the demand for separate places for the sexes. I asked him to at least provide a lock and hang the key in a conspicuous place away from the door of the closet, so the employes would know when the closet was occupied and not subject each other to intolerable embarrassment. On my second visit I found he had partially complied with my request and the conditions were improved. In another place a proprietor employing one hundred and ten men had an old shack provided for the men, which was intensely filthy, and when I reproached him for the condition of the place he replied that he had not seen it for a year and was completely surprised when I pointed out its condition to him. He immediately promised to renovate the premises and provide better facilities for his men. Another proprietor, employing fifty men, had closets that were not used by his men on account of their filth. The men told me that they suffered all sorts of distress and inconvenience rather than frequent the place. When I notified the proprietor of this condition of affairs he expressed surprise and promptly stated that he would keep the closets clean, and furthermore personally inspect them himself, and he gave as a reason that he could not afford to have his men distressed, because in that condition they could not render him a satisfactory service. I urge this circumstance as of noteworthy importance. Men cannot do their best work if their physical condition is not in full vigor.

The Secretary of the Iowa State Board of Health, Dr. J. F. Kennedy, has favored me with his opinion upon the matter under consideration, and I give below his letter in full:

IOWA STATE BOARD OF HEALTH.

SECRETARY,
J. F. KENNEDY, M. D.

OFFICE OF THE SECRETARY.

DES MOINES, June 28, 1901.

C. F. WENNERSTRUM, *Commissioner Labor Statistics*:

DEAR SIR:—Replying to your communication received this morning I have to say an habitual neglect to promptly attend to the demand of nature in the way of the evacuation of the bladder and bowels is always dangerous to the health of the individual practicing such neglect.

Not only in such cases do the bowels whose beneficent demands are thus spurned cease in time to sound, as it were, the warning, and constipation occur as a result, but the retention of this worthless and poisonous matter

in the system results in more or less absorption of it and blood-poisoning is a result. It is not necessary to go into details as to the diseases and discomforts occasioned thereby. The truth is well known to all physicians and physiologists.

One of the reasons that lead many of the laboring classes to neglect such demands is the lack of proper opportunities in the way of outhouses and water-closets. When these conveniences exist they are often in such a filthy and uninviting a condition that a person will long hesitate before resorting to them.

With every factory, workshop, and storeroom; with every place in fact where people are employed; facilities for a prompt response to the demands of nature should not only be provided but these resorts should be as comfortable and inviting as possible. I am, very respectfully,

J. F. KENNEDY.

I need not dwell more at length upon the great urgency of the need of adequate legislation to the end that proper facilities shall be supplied to workingmen and workingwomen in our factories that will render impossible the conditions I have outlined as existing in so many industrial establishments of Iowa. It is neither pleasant nor satisfactory to set forth such a state of affairs, but I should be derelict in my duty if I did not expose these conditions and insist strenuously upon their abolition. In the majority of instances the unhealthy state of affairs is due to negligence and lack of foresight and not to deliberate disregard of the laws of health, nor to mere stinginess. Notwithstanding, it is necessary to exercise the power of the state to bring about and maintain a better condition of industries and employment in this state.

(b) HEATING AND VENTILATION.

Another important matter that has received but little or no consideration either in practice or in our legislation, is the heating and ventilating of our industrial establishments, where two or more workmen are employed. It is not necessary to set forth the arguments for proper heating and ventilating of manufacturing establishments. In our schools there have been great expenditures of time and money made with a view to securing pure air and sufficient heat for the protection of the lives of our thousands of boys and girls. If it is necessary to protect our boys and girls from impure air and the diseases and ailments consequent upon improperly heated or illy ventilated school-rooms, how much more important is it to provide for the protection of working men and working women on whose health and strength the welfare of whole families depends. In some lines of industry in Iowa, for instance in the overall and shirt manufactories, and

also in the shoe factories visited by me, I was pleased to find that considerable attention had been given to the matter of heating and ventilating the work-rooms, but notwithstanding in many of them there was decided need for improvement in these respects. In the wood-working establishment, on the other hand, such a favorable report cannot be made, so far as heating is concerned. The means for heating are usually very inadequate. Men suffer severely from cold, which could for the main part be prevented. It is but just to say that with respect to the wood-working establishments the dangers from fire are much greater, and in a number of those visited the cost of a proper heating plant would be a very serious matter for the owners. Nevertheless I am strongly of the opinion that measures should be taken to do away with the ordinary stove method of heating such establishments, as it affords but little heat to men working at any distance, and it is also a constant source of danger. In dozens of shops where the men devoted themselves to iron work I found no provision whatever for heating, the men depending entirely upon heat that came from forges or furnaces. To any one that is familiar with the discomforts that are present in a large room in the winter time from lack of heat, I need say nothing more. Such buildings can be heated without inconvenience or material cost, and there should be a law compelling the factory owners to provide sufficient heat to prevent discomfort to their workmen. Our code contains peremptory statutes requiring street-car companies to provide stoves and fires in their street-cars to insure not only their patrons but their employes from the discomforts of cold weather; and we also require street-car companies to guard their motormen against bitter cold winds by means of vestibule platforms. The reasons for such legislation are just as urgent in the case of workmen in our factories.

The shoe, cigar, pant and shirt factories, as a rule, are much better ventilated than any other classes of establishments. The better ventilation in cigar factories is probably due to the organized unions that have paid particular attention to this matter on account of the danger from inhaling the fumes of tobacco in crowded quarters. I found the worst samples of ventilation in iron factories and in parts of establishments where there is work in iron under way. In these establishments the evil is very marked on account of the smoke nuisance. If the factories are not provided with ample facilities for carrying off the large volume of smoke from the furnaces, the suffering or annoyances of

the men are very pronounced. There should be specific requirements providing for cupolas for the removal of smoke in all factories where forges are employed or where iron moulding is done. In one city I found a very bad state of affairs in a foundry where the smoke settled about the shop and caused constant discomfort. I called the attention of the proprietor to the bad state of things, and he promptly complied with my request and built several cupolas, which remedied the conditions very materially.

With respect to ventilation in general, it should be made compulsory that all industrial establishments provide for their employes the minimum allowance of fresh air in order to insure health. Most of the older eastern states require a certain number of cubic feet per person: New York and Wisconsin require that each person employed must be allowed 250 cubic feet between the hours of 6 A. M. and 6 P. M., and in the latter state, that between 6 P. M. and 6 A. M. 400 cubic feet be allowed to each person.

It should also be the aim of any legislation enacted to guarantee better conditions of ventilation to secure sufficient currents of pure air in working establishments without subjecting the workpeople to drafts from windows or doors. Fans and window-guards, and other modern devices, can be provided with comparatively little cost, that will insure such results, and the benefits will be incalculable.

2—FIRE-ESCAPES.

The various investigations made by the Bureau develop another fact of great importance with respect to the facilities provided for workmen in case of fire to escape from their workrooms and factories. Out of the number of factories inspected 290 had two or more stories, and in this number I found but twenty that pretended to afford fire-escapes. Our Code, in Secs. 712 and 876, gives cities authority and power to regulate the provisions for escape from fires, but the experience and observation of the Bureau has been that cities do not exercise this authority as fully and effectually as a due regard for the lives and safety of our working population requires. Speaking of the entire state the conditions in this respect are very unsatisfactory. Local authorities have been almost criminally negligent with respect to factories. Hotels and wholesale houses are, as a rule very well provided with fire-escapes, but the factories, as indicated above, have no provisions whatever. Should fire break out in stairways or other exits, men and women

would be compelled to jump from second, third, and fourth stories at the imminent risk of life and limb. Many a factory has its doors opening in, which would prevent exit on a sudden alarm in case there should be a jam at the door. In some instances I found gates at the exits; one at the end of a stairway, opening in at the head of the stairs. In some cases where workmen would be compelled to jump from windows they would encounter a network of telephone wires in the alley.

This condition of affairs all must admit is wholly indefensible, and it is high time that stringent legislation was enacted giving authority to a state official to insist upon better facilities for the escape of working people from factories. We ought not to delay in this matter until a holocaust horrifies the state. The city authorities, as I have intimated, do not exercise the authority which they have as thoroughly as they should, nor have they gone to an extent that it seems to me they should go in requiring fire-escapes in public buildings, or in buildings where large numbers of people congregate as in factories. For instance, the city of Des Moines, by its ordinance No. 1056, requires construction of fire-escapes and standpipes for buildings exceeding two stories only. It seems to me that fire-escapes should be provided for buildings of two or more stories, particularly where women are employed. No woman and few men can jump from a second story ten or twelve feet without great risk of breaking limbs.

3—DANGEROUS MACHINERY.

Of no less consequence to human life and the well being of the employees in our factories is the safe guarding of men and women from dangerous machinery. Aside from the statutory provisions governing the inspection of mines, Iowa has never enacted any legislation covering this subject, and without any exaggeration there is urgent need of such legislation.

(a). Elevator Guards.

In the last two years there have occurred numerous fatal accidents in elevator-shafts that have come to our knowledge, and it would seem that there is an imperative need for regular and systematic inspection of elevators for the safety not only of the traveling public but of those employed thereon and in connection therewith. In most of our large factories having two or more stories, elevators are used for carrying freight and for the transportation of employees. In one instance in a large estab-

lishment the elevator was on the outside of the building; there were no guards placed about it. The lift was made for three stories, and the proprietor was wholly indifferent about keeping the doors leading to the elevator shut; and when I spoke to him about the dangerous condition of the elevator he simply laughed, and refused to take any precautions. This sort of thing should be prohibited, and the only effective way to bring about the desired reform in this matter is legislation that will give authority to the inspector to compel employers of labor to put automatic gates upon the elevator and provide other necessary safety appliances.

(b). Set screws, Gearing, and Drive belts.

In one of the largest cities in the state within the past two years there have occurred two deaths in one establishment due to protruding set screws on revolving shafts. I have learned of numerous instances where men's clothes have been torn from their bodies, and while they were not seriously injured the danger was very great. In another case a man was very seriously injured. The persons who were killed were mangled in a horrible manner. This danger is legislated against in a number of our states, and I strongly urge that you recommend some such legislation in Iowa. It should be made compulsory for manufacturers to countersink all set screws or to use flange collars on shafts.

What has just been said about set screws is equally applicable to unboxed drive belts and gearing. The dangers that are present constantly to those working about machinery where the belts and gearing are unguarded are simply dreadful in their possibilities. The gearing, regardless of location, should be provided with hoods, and every belt should be boxed wherever there is any danger probable. The dangers resulting from disregard of such protective measures are too well known for me to dwell more at length upon them. Not only should legislation provide for such safeguards as have been just outlined, but there should also be required loose pulleys and detaching appliances for throwing out of gear and stopping any machine in an establishment, so that in case of an accident and a workman is involved it would not be necessary to stop an engine and the entire machinery of the establishment before the man that is caught could be extricated.

(c). Emery wheels and Grind stones.

In the investigations of the past two years we have learned

of numbers of serious accidents resulting from the use of emery wheels, and the number of victims from this class of machinery is constantly increasing. We heard of numbers of accidents which caused the loss of eyes, and resulted in the inability of the men to carry on their work. As is well known, emery wheels are among the most dangerous, if not the most dangerous, of all machinery. It is very difficult to make them sufficiently strong and correct as to adjustment, and if they are not both strong and running true, the liability to accident is very great. It seems to me that there can be no question about the desirability of compelling manufacturers to equip all emery wheels with the latest safety appliances in order to obviate the dangers to workmen employed in or about them. Every wheel should be thoroughly tested by a competent inspector as to its character and as to the manner in which it has been set up.

In addition to such inspection the manufacturer should be required to provide dust collectors for all emery wheels. When ever used there comes from emery wheels a strong stream of sparks that produce a gaseous dust that is very injurious to the lungs. Furthermore, very frequently splinters and particles fly from the wheels that injure eyes and faces. There are appliances in the way of hoods that will protect workmen almost completely from the annoyance of dust and the dangers from splinters, and these appliances are not costly. There is another consideration that should not be forgotten: the hoods that should be placed over emery wheels act as safeguards against fire and the general contamination of the atmosphere of the workroom.

What has been said in the preceeding applies with equal force to factory grind stones.

(d) Boilers.

Connected immediately with the matter of protection of workmen from dangerous machinery with which they come in daily contact in the course of work is need for the inspection of boilers. The only protection which now exists in this state for the protection of employes is the occasional insurance of boilers by provident manufacturers. An effort was made to ascertain the number of boilers insured, but many difficulties were thrown in the way of successful investigation of this subject. It is my impression, however, that fully one-half of the boilers in our factories are insured. At least this is true of the factories which the Bureau inspected. A considerable number however,

at least one-fourth if not more, do not take any particular precautions in the way of insurance to provide against explosions. The need for thorough and systematic inspection of boilers is so obvious that it is strange indeed that there has been no legislation regarding this matter. I do not urge you to recommend the enactment of a law providing for a state inspector of boilers, for the reason that I believe adequate protection can be afforded in the passage of a law, requiring all manufacturers to insure their boilers against explosion. The mere fact of insurance will of itself secure thoroughgoing inspection by the representatives of insuring companies.

Supplementing the foregoing, I suggest the propriety of requiring a thorough examination of engineers in charge of all stationary engines. There has been little regard paid to such matters by employers of labor, for the reason that it is generally assumed it is of little or no importance. But the state should compel a more careful preparation on the part of those who expect to run stationary engines, just as our railroad companies do with their prospective engineers, and which the state has for some years required of engineers in charge of hoisting engines at our mines. The same elements of danger exist in and about stationary engines that are so apparent in the case of hoisting engines.

.PROTECTION OF RAILWAY EMPLOYEES.

While not exactly a part of the work of factory inspection, nevertheless in a measure connected with the general protection of employes is the matter of protecting railway employes from the dangers of running light engines backward without rear light at night or rear pilot at all times. Various complaints have come to the Bureau during the past two years protesting against this practice. Other complaints were made against the practice of running trains with double headers, viz: with two engines. I have been unable to make an extensive investigation of these matters, but I feel that there is some justice in the complaints, and that there should be serious consideration given them. No engine should be run at night, especially in urban districts, without headlights, rear lights, and proper guards. The practice of running double headers, it is claimed by railroad men, is very dangerous for the reason that the crew in charge of the second engine has no control whatever over the conduct of the train.

FACTORY INSPECTION LESSENS DAMAGE SUITS.

Objection will be made, doubtless, to legislation such as has been suggested on the ground of cost and interference with private rights and investments. While the objection is not, in my opinion, valid—nor would it be sustained in our courts, it may be well to suggest that there is a sufficient pecuniary inducement for such legislation as is here urged. Every accident in a factory involves probable damage suits, which mean, even if unsuccessful, considerable outlays in attorneys' fees and time wasted, and if successful serious loss in the payment of jury awards. Statutes that enforce the protection of workmen from dangerous machinery are obviously a protection to employers as well as to employees. The freedom from accident which they insure reduces the liability of employers. The state of Iowa has placed no statutory limits as is the case in New York and Illinois upon the amount of damages that may be recovered for the loss of life.

Another fact worthy of our consideration is the loss which the state and society sustain in the death of a workman or in his inability to continue work, due to serious accident through the employer's failure to protect him. Society should not hesitate to enact suitable legislation to prevent injuries or loss of life to men whose existence is the source of our wealth and industrial strength.

Both of the foregoing are substantial economic reasons for enacting the legislation which I have advocated.

4—CHILD LABOR.

Another matter which forced itself upon my attention in the course of the investigation of factories was the employment of children in a large number of our industrial establishments. It seems strange that a progressive state like Iowa should not be among the more advanced commonwealths of the Union in the matter of protecting children from too early employment in the industrial pursuits. There were voluntarily reported to me by employers 403 employes that were under 14 years of age, and subsequent inquiry developed the fact that there were 604 children employed. This number I am sure is very much below the actual number, for the reason that when I made my inquiries I found that employers were averse to affording me much information, and the children themselves whom I asked seemed to be fearful of consequences in giving me the information I

sought, even when I assured them that there was no law at present prohibiting their employment. In one instance an employer, aware before my arrival of my purpose to inquire concerning the employment of children in his city, sent home all in his factory under 14 years of age. I learned of this fact through one of the children that had been dismissed for the day.

The United States Census in 1890 reported 1644 children under sixteen years of age as employed in factories in Iowa and the enumeration of last year returned the number at 1888. These figures confirm my own investigations. For the reasons given above I am strongly of the opinion that the returns are very much below the actual number so employed.

Many of these children were as young as 10 years. In many cases the children were employed at tasks that involved hard and laborious work. They were employed for the same number of hours as mature men, and were given no privileges or special exemptions from work. I took special pains to observe the physical condition of the children that I found working in the factories, and they impressed me by their wan and over-worked condition. In many instances they were in a run-down condition and seriously weakened. In almost every instance the employers of these children, when I first approached them with my inquiries, indicated very markedly their own sense of wrong done the children by such early employment in the fact that they were under the impression that they were violating a state law.

The results of the negligence of the state in permitting young boys and young girls to enter industrial pursuits at an immature age, when they should be at school or on the playground, are very serious. Early employment stunts the physical growth, prevents mental growth and tends to hamper the moral development which proper schooling is calculated to promote. I found in a number of cases that the children had never attended school; that some had attended but a short time and had but little knowledge of books or ability to use books.

In urging you to recommend legislation against the employment of children I am not advocating a measure that is unknown to our statutes. For some years the state of Iowa has prohibited the employment of boys under 12 years in our mines, and there are equally strong reasons for the prohibition of the employment of children under that age in factories. I urge that you recommend that the age-limit in this state be 14 years instead of 12 for

both mines and factories. I believe that this age-limit is required on account of obvious physical reasons. Thirteen states of the Union have fixed upon 14 years as a limit. They are Colorado, Kentucky, Illinois, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New York, Ohio, Tennessee, and Wisconsin. The province of Ontario has done the same thing. Four states place the limit at 12, as in the case with children in mines in Iowa, viz : California, Maine, Maryland, and West Virginia. New Hampshire has the lowest limit of all—10 years. Rhode Island has a variable limit of from 12 to 15 years. The average work age of these twenty states is 13.45.

It seems to me that Iowa should not be backward longer in this important matter of prohibiting the employment of children under 14 years of age in factories as well as in mines. We cannot afford to allow such employment to continue for humanitarian reasons if for no other. I do not advocate a sweeping and absolute law that would deny the right to work to a stout boy of 12 or 13 years of age in case he is the sole support of a widowed mother or orphaned brothers or sisters of young age. Wisconsin and other states exempt children from the provisions of the child-labor law in such cases, but aside from this exemption we owe it to ourselves as a state to remedy this deficiency in our laws as soon as possible.

II.

STATISTICS OF STRIKES.

One of the most important undertakings of the Bureau in the past two years was the investigation of strikes that have taken place in Iowa in the past six years. Previous reports of this Bureau have given some information on this subject, but it is rather meager. The National Department of Labor at Washington, in its tenth annual report, gave an exhaustive report of strikes and lockouts that had occurred in Iowa prior to June 30, 1894. The Bureau undertook to secure and compile the statistics from June 30, 1894, up to and including December 31, 1900. Our work was very materially aided by the presence during the greater part of the investigation of the special agent of the United States Bureau of Labor, Mr. Adelbert M. Dewey, who was making a similar investigation at the same time. The Bureau availed itself of his

information and helpful suggestions, and our work was conducted and the results tabulated upon the same lines and with the use of the same schedules as employed by the department at Washington. In fact in many instances we were favored with information respecting certain strikes and lockouts that was acquired by the department at Washington prior to our undertaking the work. Indeed this was simply one of the many acts of kindly assistance which the Bureau has received from Commissioner Carroll D. Wright and his assistants at Washington. All of the data in our investigation of strikes was carefully scrutinized. Where the reports of employers and employes agreed no subsequent investigation was made as to the reliability of the reports. In cases however where the reports differed as to important facts we verified our findings in every particular.

The results of our investigation show that in the six years and a half covered in our reports there occurred 831 strikes. By a strike is meant the cessation of work even for one day by one man in an establishment, but the term strike includes all the establishments affected by a strike order; for example a strike is ordered in the mining districts, and fifty mines are involved. In this investigation we consider the stoppage of work of the mines only as one strike and not fifty different strikes.

The strikes reported occurred in thirty-four counties of the state. The names of the counties, and the number of strikes in each county, were as follows:

Allamakee.....	2	Lucas.....	2
Appanoose.....	181	Mahaska.....	19
Blackhawk.....	3	Marion.....	4
Boone.....	8	Marshall.....	1
Cedar.....	1	Monroe.....	19
Chickasaw.....	1	Montgomery.....	2
Clayton.....	1	Muscatine.....	13
Clinton.....	1	Palo Alto.....	1
Crawford.....	1	Polk.....	131
Des Moines.....	7	Pottawattamie.....	6
Dubuque.....	14	Poweshiek.....	1
Emmett.....	1	Scott.....	44
Payette.....	1	Taylor.....	3
Jasper.....	2	Wapello.....	32
Keokuk.....	8	Wayne.....	1
Lee.....	1	Webster.....	25
Linn.....	13	Woodbury.....	17

The number of employes going out on strikes aggregated 32,930. The total number of days establishments were closed

amounted to 4006. The loss in wages aggregated \$1,440,679; the loss to employers in the same period amounted to \$548,185; the number of establishments involved in strikes for the period under consideration aggregated 831; the number closed amounted to 669. Out of the 381 strikes undertaken, there were successful those in 211 establishments, and partly successful those in 82 establishments; and they failed entirely in 315 establishments; showing 608 separate settlements or conclusions.

The returns show that out of 296 strikes involving 694 establishments ordered by labor organizations, they were successful in 237, were partly successful in 87, and failed in 370 establishments. It is also shown that out of 85 strikes that were undertaken without being ordered by labor organizations involving 137 establishments, they were successful in 76 and failed in 61 establishments. I give below:

AN EXHIBIT SHOWING THE RESULTS OF THE UNION AND NON-
UNION STRIKE.

YEAR	Number ordered by labor unions.	Number establishments affected.	Successful.	Partly successful.	Failed	Number not ordered by labor unions.	Number establishments affected.	Successful.	Failed
1894	43	43	30	.....	13	2	2	1	1
1895	14	248	24	60	164	16	17	4	13
1896	47	47	29	.....	18	6	6	.....	6
1897	114	114	51	14	49	4	4	3	1
1898	28	28	17	1	10	7	7	3	4
1899	26	70	36	9	25	23	73	52	21
1900	24	144	50	3	91	27	28	13	15
Total	296	694	237	87	370	85	137	76	61

The apparent discrepancy between the number of strikes ordered and the number of strikes which were disposed of, either by settlement or failure, arises from the fact that the 381 strikes involved 831 establishments, in which the strikes might be settled by separate negotiations for each one or for a group of establishments; hence the number of strikes disposed of aggregates nearly double the number of strikes ordered, viz.: 608.

The summary of strikes by industries is of special interest. The large majority, or 633 out of 831 strikes, took place in the coal-mining districts. The next largest number, viz., 39, took place in the building trades. Thirty-four strikes occurred among cigarmakers. Thirty-two were resorted to in the plumbing and heating trades.

Taking the six years, more strikes occurred in 1895 than in any other year—265 as against 172 in 1900, the year of the next

largest number of strikes. The smallest number of strikes occurred in 1898, only thirty-five being ordered. The next smallest number took place in 1896, viz.: 53. The strikes in the mining industries occurred as follows: In 1895, 251; in 1896, 45; in 1897, 112; in 1898, 25; in 1899, 84; in 1900, 74. The year 1900 seems to have been the critical time in building trades. The reports show that thirty-seven strikes took place last year, as against two strikes in the preceding three years and a half. No strikes took place in the building and plumbing trades from July, 1894, until 1899, when nineteen occurred, and in 1900 thirteen strikes took place.

In general, it may be said that Iowa has not been disturbed by industrial warfare to such a serious degree as many of our sister states, owing in the main to the conciliatory attitude taken by both employes and employers, and to the fact that we do not have such a large urban population and extensive manufacturing interests as we find in some eastern states.

III.

STATISTICS OF LABOR ORGANIZATIONS.

The Bureau has made an investigation of the development of Trades Unions in the state of Iowa, which is shown in detail in the tables. The reports show, besides the locality and name of the unions, the year of organization, the number of members, the maximum of working hours per day of the membership, the minimum rate of wages, the time unit for payment, and the daily wages of the most skilled in each union. There is also shown whether the union demand the employment of union men only in the localities and industries in which they are organized. Finally there is shown the total number in the locality working at the trade in which the union is organized.

It appears from the record that the first organization of labor took place in Dubuque in 1858 when a typographical union was formed. The locomotive engineers established their order first in 1869, the locomotive firemen in 1875. The cigarmakers did not organize until 1881. In 1890 there were 173 unions in the state. We have been unable, however, to obtain the number of their membership. Between 1890 and 1897 only thirty-nine new unions were added, but since the later date the increase in labor unions has been very marked. During the four years since 1897,

184 unions have been organized. The Bureau learned of 396 unions. Eleven of this number refused to report their membership or give us any information concerning their history and work. The tables do not include forty-two Threshermen's unions, as to which we could secure no information whatever. However, I believe they are not legitimate labor unions. The total membership of the 385 unions reporting their membership aggregated 26,068 in 1900. These various unions report forty-eight different crafts or lines of industries, and are found in eighty-eight different localities.

The summaries by counties show some interesting figures, as to the strength of labor unions in various localities. Polk county leads all others in the number of unions and in total membership, there being fifty-eight unions and 4,855 members in 1900. Woodbury county comes next in the number of unions, with twenty-nine, but with only a membership of 1,372; whereas Appanoose county, with but twenty unions, shows union membership to the number of 2,285. The following counties have fifteen or more labor unions, viz: Boone, seventeen; Clinton, fifteen; Des Moines, eighteen; Dubuque, nineteen; Lee, eighteen; Linn, twenty-seven; Mahaska, nineteen; Wapello, twenty-eight. The union labor population of these counties, however, varies very markedly. Boone has 1,568, Clinton, 1,015; Des Moines, 825, Dubuque, 579; Lee, 497; Linn, 1,143; Mahaska, 1,688; Wapello, 1,793.

One important result of the investigation is shown in the table, in the column under wages, where the minimum rate of wages and the wages of those more highly skilled are given. The returns show that the wages of the most proficient workmen in organized trades exceed the minimum wage rate on an average of about 33 per cent.

IV.

STATISTICS OF MANUFACTURERS.

The Bureau undertook to compile the statistics of the manufacturing industries of Iowa for the year 1900, but in the course of our investigations I learned that we were paralleling a similar investigation, then under way, under the direction of the United States Census Office, covering the same year 1900. As our means and facilities for prosecuting such an investigation were, compared

with those at the command of the Washington authorities very limited, and as Colonel S. N. D. North, Chief of the Division of Manufacturers of the National Census, very courteously granted this Bureau permission to utilize the results of the investigations, I have therefore, incorporated their compilations in the accompanying report. The extent of my obligations to Colonel North may be appreciated when I state that he took up the statistics of Iowa Manufacturers ahead of their regular order in order to get them ready for use in this report and he sent the original tables on to me for use here.

The census shows that in 1899, there were in Iowa 14,819 establishments with a total capital of \$102,733,103, which took the form of land, \$11,701,330; of buildings, \$18,554,185; of machinery, tools and implements, \$26,150,011; of cash and sundries, \$46,327,557. The number of proprietors and firm members owning or operating these establishments aggregated 16,619 persons. The number of salaried officials, clerks and the like, amounted to 5,654, whose aggregate salaries reached the sum of \$4,486,117. The total number of persons employed and receiving wages amounted to 58,553. The total wages paid these work people reached the sum of \$23,931,680. Of these wage earners, 48,417 were men of sixteen years of age and over, whose wages amounted to \$21,893,983; 8,248 were women of sixteen years and over, who received wages to the amount of \$1,766,586; and 1,888 were children under sixteen years of age, who were paid \$271,111. The returns show that the operating expenses of these establishments, not including the cost of materials used in manufactures, were \$1,166,867, in rent for works; \$547,634, for taxes; \$5,592,216, for rent of offices, interest, etc.; \$682,037 for contract work, all of which totals \$7,988,767. The cost of materials used aggregated \$101,170,357, of which, \$2,258,923 was expended for fuel and rent of power and heat, and \$98,911,434 was expended for principal materials, including mill supplies and freight.

The total value of the products turned out by Iowa factories in 1899, as a result of the foregoing outlays of capital and labor, amounted to \$164,617,877.

The past ten years have been marked by a very decided increase in the number of manufacturing establishments in Iowa, increasing from 7,440 in 1890 to 14,819, an increase of 99.2 per cent. The capital invested has increased from \$77,513,997 to \$102,733,103, an increase of 32.5 per cent. The wage earners have increased from 51,037 to 58,552 in the ten years, or 14 per cent.

Of this number the men have increased from 44,210 to 48,417 or 9.5 per cent; the women have increased from 5,183 to 8,248, or 59.1 per cent, and the children under sixteen years of age increased from 1,644 to 1,888, or 14.8 per cent.

The ten leading industries in which Iowa capital is employed shown in the tables, are carriage and wagon factories, cheese, butter and milk concerns, brick, tile and pottery plants, flouring mills, food factories, foundries and machine shops, lumber and planing mill establishments, and printing and publishing, slaughtering and packing houses. The capital employed, the wages paid and the number of people employed, the operating expenses, the cost of materials, and the value of the products turned out by these several establishments are shown in detail in the summaries.

The industry in which the most capital is invested comprises the lumber and planing mill factories; the amount employed in the manufacture of lumber and timber products aggregated \$8,762,219, and in the planing mills, wherein sashes, doors and blinds are produced, there are \$3,576,305 additional capital invested. The industry coming next to the lumber industry in the amount of capital employed, is the milling industry, for the production of flour, total capital amounting to \$6,421,078. Printing and publishing come next, with an aggregate capitalization of \$5,679,390. The industry which employs the next largest amount of capital is that devoted to the manufacture of carriages and wagons, in which there was \$4,087,400 employed. The brick, tile and pottery industry absorbed \$3,437,613, and the capital employed in the manufacture of cheese, butter and condensed milk, required 3,459,017. The capital invested in foundries and machine shops totaled \$3,732,774. The industry devoted to the preparation of foods represented a capital of \$2,501,521.

In nearly all of the industries there have been increases in the amount of capital employed and in the value of the manufactured products. There has been one notable exception, however, the capital employed in the factories devoted to lumber and timber decreased from \$17,530,355 in 1890 to \$8,762,219 in 1900, the value of the product decreasing from \$12,056,312 in 1890 to \$8,677,058 in 1900.

The most marked increase in any of the industries took place in the establishments devoted to the manufacture of food preparations. While the number only increased from eight to sixteen in the last decade the capital employed increased nearly five

times from \$579,866 to \$2,501,521; the wage-earners employed, from 147 to 609; the wages paid, \$56,364 to \$209,031; and the value of the product manufactured, from \$900,811 to 3,604,031.

Those interested in the manufacturing in the various localities in the state will find table No. 2 of great interest, wherein are shown all of the above information for each of the ninety-nine counties of the state. Following the exhibits for the counties will be found the same information for the leading industrial towns of the state, numbering forty in all; the concluding tables show the comparative growth of manufactures in the eight largest cities in Iowa, from 1890 to 1900, viz.: For Burlington, Cedar Rapids, Clinton, Council Bluffs, Davenport, Des Moines, Dubuque and Sioux City.

V.

LOCATION OF NEW INDUSTRIES.

One of the duties of the Bureau of Labor Statistics is the collection of information relative to localities "offering natural or acquired advantages for the profitable location and operation of different branches of industries," and the Commissioner is also required "by correspondence with interested parties in other parts of the United States impart to them such information as may tend to induce location of mechanical and producing plants within the state, together with such other information as shall tend to increase the productions and consequent employment of producers." (Sec. 2470 of the Code). In pursuance of the directions of the Code I had prepared two thousand circular letters and sent them to representative men in the state including members of the legislature, mayors of cities, and all newspapers, and the results of our correspondence are given in detail in the report.

The replies received indicate a large and active demand for new industries in nearly all of our Iowa towns, and cities and they evince a disposition on the part of the citizens to co-operate in securing additions to their local industries. The experience of the Bureau, however, convinces me that there is a great need for an appropriation that will enable the Commissioner to place advertisements in the trade journals in various sections of the country. We were unable to hit upon a practicable plan for entering into correspondence with parties in other states that were on the look out for profitable investments in manufacturing lines.

It is useless to attempt to reach investors unless we do so through trade journals. The department might be able to do something if it had funds to subscribe for Eastern trade journals, but I am convinced that the only feasible plan is to place advertisements in leading trade and industrial journals, and I therefore urge that you recommend to the legislature an appropriation to be expended by the Commissioner of Labor, as suggested, by and with the consent of the Executive Council. I am certain that with such action on the part of the legislature the provisions of the Code can be rendered effective. If there is no such provision made it is useless to attempt to carry out that requirement of the statute.

SPECIAL INDUSTRIES.

I investigated three special industries, viz: Sugar beet culture, the gypsum industry and the preparation of flax for upholstery purposes. In the first of these industries I had to obtain my information from outside the state. In case of the second I used the report of the geological survey and verified same by personal investigations. The third industry is comparatively new, and I use as much of the information as can be done without divulging the private affairs of those engaged in the business, which disclosure would be contrary to law, and would defeat further statistical inquiries.

SUGAR BEET CULTURE.

The growing of sugar beets in Iowa has assumed considerable proportions in later years. In 1900 there was grown and shipped from Iowa to Nebraska and Minnesota sugar factories 5687 tons of beets, whose total value is given as \$20,068.00, distributed as follows: Buena Vista county 325 tons; Cerro Gordo county 1,098 tons; Hamilton county 1,393 tons; Hardin county 485 tons; Marion county 675 tons; Webster county 597 tons; Jasper and Franklin counties together 225 tons, at an average price of \$3.50 per ton at shipping station; total value of which is given as \$17,143.00. Harrison county with a contract acreage of 76 acres shipped 783.35 tons (10.31 tons to the acre) at an average price of \$3.67 per ton, valued at \$2,875.00. I will not undertake here to express an opinion on the desirability of sugar beets as a farm crop, either as to its effect on land or its furnishing a greater or less return on the investment.

This information comes directly from the Standard Beet Sugar Company of Leavitt, Nebraska, and from the Minnesota Sugar Company of St. Louis Park, Minnesota, and is correct as taken from their books, and is vouched for by these concerns. The Minnesota Sugar Company was unable to give us the total acreage, because the acreage contracted for was not fully delivered. But enough has been given to show that beet culture is on the increase to say nothing of the beets grown for feeding purposes, of which we have no record.

THE GYPSUM INDUSTRY.

Concerning this important industry we quote from IOWA GEOLOGICAL SURVEY for 1901, Vol. XI, pp. 39, 40, 42, 51 and 52. The report says:

"1899 value of production (estimated) \$600,000.00 (with 6 producers). 1900 value of production \$393,750.00 (with 7 producers)." A decrease in production of \$206,250.00 and an increase of one producer during year.

Report says of 1900:

"The Gypsum market was not quite so brisk as during the preceding year. Most of the mills were able to fill their orders by running a single shift, while during 1899 double shifts were quite the rule."

Under head of "miscellaneous" we find credited to "Webster county \$393,750.00" which is known to be the gypsum output for the year 1900.

Again, "The gypsum trade continued brisk during 1900 but double shifts at the mills were not found to be necessary to fill orders as during the preceding year. Early in the season, owing to the installation of new plants, stucco sold as low as \$5.00 per ton on board the cars at Ft. Dodge and Carbon Station. The average price for the year would be considerable higher, perhaps \$5.25 per ton would be a conservative figure. The output for 1900 would exceed 75,000 tons."

Which latter statement we have verified by personal inquiries.

UPHOLSTERING TOW.

There are five mills preparing flax for the market, viz: At McIntire, Elma, Cresco, New Hampton and Meltonville.

The five mills employ altogether forty-six men, and the value of the product of four of them is given as \$47,750 for 1900.

They paid in wages during that period \$10,536, but were

unable to give the average wages for each person, owing to the fact that but two of them are reported as employing help during the whole year.

Two of the mills whose collective output is given as \$14,850, used the product from 995 acres of land and shipped ninety car loads of tow. From the other three mills we were unable to obtain similar information.

Value of raw material used by four of these mills is given as \$17,200.

Capital invested in four of them is reported as \$25,000.

This industry is comparatively new in Iowa, the tow being generally considered a by product, and the seed the real product, which, now added to the tow product, makes a good return, and were it not that flax is reported hard on the soil its growing would become more general.

The tow product alone for two mills average in value \$5.43 per acre at the mills.

ABOLITION OF STATUTORY BLANK URGED.

Our experience during the past two years leads us strongly to urge the abolition of the statutory blank provided for in section 2474 of the Code, for reporting statistics. There is a number of objections to the blank: First, it applies only to persons or corporations employing five or more people. The returns under the blank consequently afford us only partial information as to manufacturing establishments of the state. The second objection is, it includes many establishments not factories and industrial establishments proper; as, for example, hotels and restaurants, that may employ five or more people; third, there is a general objection to limiting the Bureau by a prescribed and unchangeable blank. No other departments of labor, so far as our knowledge goes, are so restricted. The heads of such bureaus are given general directions in the statutes as to the kind of information desired, and are allowed a wide discretion in the preparation of the blank forms for acquiring information, and such discretion should be given the one in charge of the Bureau in this state. I deem it very important, and ask that you urge this matter upon the legislature.

NEED OF INCREASED APPROPRIATION FOR BUREAU.

The great amount of work that properly comes within the duties of the Bureau justifies me in asking you to recommend an allowance for clerical assistance. The work of the office, if properly done, demands the entire time of the chief and his deputy, and we have been hampered not a little during the past period by the lack of a stenographer who could have relieved us of a vast amount of mere clerical work that we have been compelled to do, as I believe, to the detriment of our regular and proper work. The other departments are given an allowance for stenographers, and a similar privilege should be extended to this Bureau. Another embarrassment to which this Bureau has been subjected has been the operation of the code provision relating to the appropriation for traveling expenses. By the ruling of the Attorney-general, the annual appropriation began October 1st, dating from the time the code took effect in 1897, and if all our appropriation is not used within the year the unexpended balance is covered back into the state treasury. Now, it frequently happens that the work of the Bureau is such that it is not desirable or economical, in the first year of the commissioner's term, to use the entire appropriation within the annual period. Under the practice of the Auditor's office the unexpended balance is cut off from the Bureau. This is not as it should be, and I hope you will urge upon the legislature an amendment of the existing provision so as to give the department entire control of the fund for traveling expenses during the entire biennial period, subject, of course, to the consent of the Executive Council, as is the case at present. With the law amended as suggested the Bureau can make its investigations at more convenient times and under conditions that are more satisfactory.

It is not improper for me to direct your attention to the need of increasing the scope and effectiveness of the work of this Bureau. Iowa has not, up to the present time, granted generous appropriations for the carrying on of statistical inquiries and compilations of industrial statistics. The result is that this Bureau has not been able to do the work on as extensive a scale as desired. Many states of the Union appropriate considerable sums for the maintenance of the bureaus of labor statistics, and

these bureaus have done splendid work in many directions in securing for the public extensive and accurate information classified and summarized for general dissemination. It is not agreeable to record the fact that Iowa is practically at the bottom of the list in proportionate expenditures for bureaus of labor. Upon the basis of *per capita* outlay, Iowa spends the smallest amount of all the states.

Below is given a table in which is presented the amount *per capita* expense per thousand of population for 1900. This table is not only interesting but instructive, and it seems to me it affords a stronger argument for increased appropriations for enlarging the work of the Bureau than anything I can say on the subject. A table is also given in the Report showing the scope and the appropriations in each state where there are Bureaus of Labor Statistics.

ANNUAL EXPENSE FOR BUREAU'S OF LABOR STATISTICS
PER THOUSAND OF POPULATION.

STATES. (Having bureaus.)	POPULATION (Census of 1900)	Annual ex- pense per thousand of population.
<i>a</i> California.....	1,485,053	\$ 5.74
Colorado.....	539,700	4.07
<i>b</i> Connecticut.....	908,420	33.11
<i>c</i> Illinois.....	4,821,550	6.56
<i>d</i> Indiana.....	2,516,462	3.98
<i>e</i> Iowa.....	2,231,853	1.68
<i>f</i> Kansas.....	1,470,495	4.42
Kentucky.....	2,147,174	6.52
Louisiana.....	1,381,625	2.53
Maine.....	694,466	5.00
Maryland.....	1,190,050	4.20
<i>g</i> Massachusetts.....	2,805,346	9.44
<i>h</i> Michigan.....	2,420,982	12.18
<i>i</i> Minnesota.....	1,751,791	6.96
<i>j</i> Missouri.....	3,106,665	8.60
Montana.....	213,329	26.75
<i>k</i> Nebraska.....	1,068,539	4.39
New Hampshire.....	411,588	8.00
<i>l</i> New Jersey.....	1,885,369	3.19
<i>m</i> New York.....	7,268,012	17.14
North Dakota.....	319,146	12.54
North Carolina.....	1,893,810	1.85
<i>n</i> Ohio.....	4,157,545	10.65
<i>o</i> Pennsylvania.....	6,302,115	6.26
<i>p</i> Rhode Island.....	428,556	10.65
<i>q</i> Tennessee.....	2,020,616	1.98
<i>r</i> Washington (State).....	518,103	11.98
<i>u</i> West Virginia.....	958,800	3.65
<i>w</i> Wisconsin.....	2,069,042	15.46

a Includes factory inspection. *b* Includes factory inspection and free employment offices. *c* Includes factory inspection and free employment bureaus. *d* Includes factory inspection. *e* Includes factory inspection. *f* Includes factory inspection. *g* Includes factory inspection and census work. *h* Includes factory inspection and uninspection. *i* Includes factory inspection. *j* Includes factory inspection. *k* Includes factory inspection. *l* Does not include factory inspection. *m* Includes factory inspection. *n* Includes factory inspection. *o* Includes factory inspection. *p* Includes factory inspection. *q* Includes factory inspection. *r* Includes factory inspection. *u* Includes factory inspection. *w* Includes factory inspection.

ACKNOWLEDGMENTS.

I cannot conclude this report without making due and proper acknowledgment of my great obligations to various persons and organizations that have assisted me individually and afforded the Bureau much information in the preparation of this report. Secretaries and other officers of labor organizations, the proprietors of manufacturing establishments, statisticians, and commissioners of labor of various states have been uniformly courteous and prompt in their replies to inquiries. To his excellency, the Governor, I am under special obligations for much encouragement and many courtesies in the course of my work. To the Hon. Carroll D. Wright, Commissioner of National Department of Labor at Washington, and to Chas. E. Baldwin, one of his expert assistants, I desire to express my deep sense of gratitude for numerous instances of assistance and kindly suggestions.

Special acknowledgments are due to my deputy, Mr. Arthur E. Holder. He has been not only exceptionally faithful in his work during the entire term of service in the Bureau, but an enthusiastic worker in the prosecution of the inquiries of the Bureau and in the preparation of this report. Respectfully,

C. F. WENNERSTRUM,
Commissioner.

To Hon. L. M. Shaw, Governor of Iowa.

FACTORY INSPECTION.

FACTORY

TABLE

Height of factory, employes, hours worked, motive power

Estab- lish- ment. num- ber.	Numb'r of stories in factory.	Are fire escapes provided.	NUMBER OF EMPLOYES.			Number of children under 14 years.	Hours worked per day.
			M.	F.	Total.		
1	2	No	148		148	3	10
2	4	No	100	50	150	None	10
3	5	No	30	12	42	None	10 (n)
4	2	No	5	30	35	None	10
5	2	No	30		30	6	10
6	2	No	13		13	None	10
7	2	No	13		13	None	10
8	3	No	150	125	275	10 (q)	10
9	2	No (5)	10	22	32	None	10
10	2	No (6)	40		40	None	10
11	2	No	19		19	None	10
12	2	No	(n) 9		9	None	10
13	2	No	7		7	None	10
14	3	Yes	125	15	140	None (n)	10
15	2	No	20		20	None (r)	10
16	2	No	30	20	50	20	10
17	2	No	68		68	None	10
18	1	No	6		6	None	10
19	3	No	100	200	300	None (c)	10
20	2	No	100	100	200	None (c)	10
21	5	No					
22	3	No	45	55	100	5	10
23	2	No	120	03	123	None (c)	10
24	3	No	12	18	30	None (c)	10
25	3	No	44		44	1	10
26	3	No	40		40	None	10
27	5	Yes	125	25	150	(b) 6	10
28	1	No	350		350	None	10
29	1	No	12	20	42	3	10
30	4	Yes	100		100	(c) 6	10
31	2	No	125		125	None (c)	10
32	4	Yes	35	7	42	None (c)	10
33	2	No	45		45	None (c)	10
34	4	No	50		50	None	10
35	1	No	5		5	None	10
36	3	No	225	125	350	(c) 4	10
37	1	No	6		6	None	10
38	3	No	60	6	66	1 (c)	10
39	3	No	30		30	None (w)	10
40	2	No	30		30	None	10
41	3	No	15	4	19	None (c)	10
42	3	Yes	10		10	1	8
43	1	No	5		5	None	9
44	1	No	3		3	None	8
45	3	No	40	7	47	None	9
46	3	No	40		40	None	10
47	2	No			(e)	None	10
48	3	No	15		15	None	8 (p)
49	1	No	10		10	None	10
50	4	No	250		250	10 (c)	10
51	5	Yes	700	50	750	13 (c)	10
52	5	No	40		40	None (c)	10
53	3	No	12	8	20	1 (c)	10
54	7	No	35		35	3 (c)	10
55	2	No	10		10	None	12

INSPECTION.

No. 1.

used, accidents to employees, and boiler inspection.

Establishment number.	Motive power used.	Accidents to employees, number wounded.	BOILER INSPECTION.		
			By boiler-maker.	By engineer.	How often.
1	Electric	2	None	Yes	Monthly.
2	Steam	None	Yes	Yes	Monthly.
3	Steam	None	Yes	Yes	Quarterly.
4	Steam	1 (h)	Yes	Yes	Quarterly.
5	Steam	None	Yes	Yes	Monthly.
6	Steam	None	No	Yes	Quarterly.
7	Steam	None	No	Yes	Once (o)
8	Steam	None	No	Yes	4 Annually.
9	Steam	None	No	Yes	Monthly.
10	Steam	None	No	Yes	Monthly.
11	Steam	None	Yes	Yes	Monthly.
12	Steam	None	No	No	(i)
13	Steam	None	No	No	Bi-monthly.
14	Steam	None	No	Yes	Regularly.
15	Steam	None	No	Yes	Regularly.
16	Steam	None	No	Yes	Semi-annually.
17	Steam	None	Yes	Yes	Semi-annually.
18	Steam	None	Yes	Yes	Semi-annually.
19	Steam	None	Yes	Yes	Annually.
20	Steam	None	Yes	Yes	Annually.
21	Steam	None	Yes	Yes	Annually.
22	Gasoline	None	No (g)	Yes	Weekly.
23	Steam	None	Yes	Yes	Weekly.
24	Water (w)	None	No	Yes	Annually.
25	Steam	None	Yes	Yes	Quarterly.
26	Steam	(f)	Yes	Yes	Quarterly.
27	(M)	None	No	No	Monthly.
28	Steam	None	Yes	No	Monthly.
29	Steam	None	No	Yes	Quarterly.
30	Steam	None	Yes	No	Quarterly.
31	Steam	None	Yes	No	Quarterly.
32	Steam	None	Yes	No	Quarterly.
33	Steam	None	Yes	No	Regularly.
34	Gas	None	No	No	(l)
35	Steam	None	Yes	Yes	Regularly.
36	Steam	None	Yes	Yes	Regularly.
37	Steam	None	Yes	Yes	Regularly.
38	Electricity	None	Yes	Yes	Semi-annually.
39	Electricity	None	Yes	Yes	Semi-annually.
40	Steam	None	No	Yes	Monthly.
41	Steam	None	Yes	Yes	Quarterly.
42	Steam	None	Yes	Yes	Quarterly.
43	Steam	None	Yes	Yes	Quarterly.
44	Steam	None	Yes	Yes	Quarterly.
45	Water & electricity	None	Yes	Yes	Quarterly.
46	Steam	None	Yes	Yes	Quarterly.
47	Steam	None	(r)	Yes	Regularly.
48	Steam	None	Yes	Yes	Regularly.
49	Electricity	None	Yes	Yes	Bi-monthly.
50	Steam	None	Yes	Yes	Bi-monthly.
51	Steam & electricity	None	Yes	Yes	Quarterly.
52	Steam	None	Yes	Yes	Quarterly.
53	Steam	None	Yes	Yes	Quarterly.
54	Steam	None	Yes	Yes	Quarterly.
55	Steam	1 (h)	No	Yes	Semi-monthly.

TABLE No. 1

Establishment number.	Number of stories in factory.	Are fire escapes provided.	NUMBER OF EMPLOYEES.			Number of children under 14 years.	Hours worked per day.
			M.	F.	Total.		
56	2	No	3	1	4	None	10
57	1	No	2		2	None	10
58	4	No	15		15	None	12
59	3	No	7		7	2	10
60	5	Yes	41	9	50	None	10
61	1	No	5	3	8	None	10
62	3	No	58	80	138	None	10
63	4	No	14	2	16	None (c)	10
64	1		15		15	None	10
65	2	No	6		6	None	10
66	2	No	14		14	None	10
67	3	No (f)	50		50	None	10
68	2	No	15		15	None (c)	10
69	2	No	2	2	4	None (c)	10
70	2	No (f)	18		18	None	10
71	2	No	11		11	None	10
72	1		5		5	None (c)	10
73	4	Yes	100	30	130	None	10
74	4	No	25	40	65	None	10
75	2	No	6		6	None	10
76	2	No	8		8	None	10
77	6	No	60		60	1 (c)	12
78	1		18		18	None	8
79	1	No	(n)			None	10
80	4	No	30	18	48	None	10
81	2	No	5		5	None	10
82	2	No	30		30	None	10
83	6	Yes	1100		1100	None (c)	10
84	2	Yes	125		125	None	10
85	2	No	20	3	23	None	9
86	1	No	20			None (c)	9
87	2	None	40		40	None	10
88	2	No	150		150	1 (c)	10
89	1	No	90		90	None (c)	10
90	1	No	6		6	None	10
91	2	No	40	8	48	None (c)	10
92	1	No	40		40	None (c)	10
93	4	No	23	40	63	None (c)	10
94	3	No	16	20	36	None (c)	10
95	3	No	10	5	15	None	10
96	2	None	7	30	37	None	10
97	1	No	18	4	22	None (c)	9½
98	2	No	9	6	15	None	10
99	4	Yes (p)	20	90	110	8	10
100	4	No	175	50	225	None (c)	10
101	3	No	18		18	None (c)	10
102	2	No	5		5	None	10
103	2	No	5		5	None	10
104	1	No	5		5	None	10
105	1	No	58		58	None	10
106	1	No	25		25	None	10
107	1	No	7	16	23	None	10
108	1	No	9		9	None	10
109	3	No (f)	18		18	None	10
110	1	None	7		7	None	10
111	2	No	5		5	None	10
112	1	No	12		12	None (c)	10
113	1	No	5	3	8	None	10
114	1	No	2	3	5	None	10
115	2	No	5		5	None	10
116	3	No	15	35	50	14	10
117	2	No	6	16	22	None	10
118	6	No					
119	2	No				None	10
120	1	No				None	10
121	4	No	90		90	None	10
122	2	No	50		50	None	10
123	2	No	11		11	None	10
124	1	No	4		4	None	10
125	4	Yes	40	300	340	None	10
126	1	No	5		5	None	10
127	4	No	10	140	150	5 (c)	8

—CONTINUED.

Establishment number.	Motive power used.	Accidents to employees, number wounded.	BOILER INSPECTION.		
			By boiler-maker.	By engineer.	How often.
56	Steam (1)	None			
57	Steam	None			
58	Steam	None	Yes		Quarterly.
59	Gasoline	None			
60					
61	Steam	None	Yes		Yes.
62	Steam	None	Yes		Quarterly.
63	Steam				
64	Electricity	None			
65		None			
66	Steam	None	Yes		Regularly.
67	Steam	None	Yes		Semi-monthly.
68	Electricity	None			
69	Electricity	None			
70	Electricity	None			
71	Steam	None	Yes		Quarterly.
72	Steam	None			
73	Steam	None	Yes		Regularly.
74	Steam	None	Yes		Quarterly.
75	Steam	None	No	No	
76	(L)	None			
77	Steam	None	Yes		Regularly.
78	Steam	None	Yes		Regularly.
79	Steam	None	Yes		Regularly.
80	Electricity	None			
81	Steam	None	Yes		Regularly.
82	Steam	None	Yes		Quarterly.
83	Steam	None	Yes		Quarterly.
84	Steam & Electricity	None	Yes		Quarterly.
85	Electricity	None			
86	Steam	None		Yes	Monthly.
87	Steam	None	Yes		Semi-annually.
88	Steam	None	Yes		Quarterly.
89	Steam	None	Yes		Monthly.
90	Steam	None	Yes		(S)
91	Steam	None	Yes		Quarterly.
92	Steam	None	Yes		Quarterly.
93	Steam	None	Yes		Semi-annually.
94					
95					
96					
97					
98					
99	Steam	None	No	Yes	Monthly.
100	Steam	None	Yes		Regularly.
101	Steam	None		Yes	Monthly.
102	Steam	None	No	No	
103	Leased	None			
104	Steam	None	Yes		Monthly.
105	Steam	None	Yes		Quarterly.
106	Steam	None	Yes		Quarterly.
107	Steam	None	Yes		Quarterly.
108	Steam	None	No	Yes	Regularly.
109	Steam	None	No	No	
110	Steam	None	Yes		Regularly.
111	Electricity & Steam	None	Yes		Regularly.
112	Steam	None	No		
113					
114	Steam	None			
115	Steam	None			
116	Steam	None			
117	Steam	None			
118	Steam	1 (h)	Yes		Regularly.
119	Steam	None	Yes		Regularly.
120	Steam	None	Yes		Regularly.
121	Steam	None	Yes		Regularly.
122	Steam	None	Yes (1)		Monthly.
123	Steam	1 (a)	Yes (1)		Regularly.
124	Steam	None	Yes		Monthly.
125	Steam	None	Yes (1)		Regularly.
126	Steam	None	Yes		Quarterly.
127	Steam	None	Yes		Quarterly.

TABLE No. 1

Establishment number.	Numb'r of stories in factory.	Are fire escapes provided.	NUMBER OF EMPLOYEES.			Number of children under 14 years.	Hours worked per day.
			M.	F.	Total.		
128	5	No	14	150	164	10 (c)	10.
129	5	No (b)	325		325	None	10.
130	4	Yes	100	50	150	None	10.
131	2	No	6	40	46	None	10.
132	4	No	30	30	60	6 (c)	10.
133	3	No	2	10	12	None	10.
134	3	No	50	5	55	None	10.
135	3	No (f)	2	2	4	None	10.
136	1		110		110	None	10.
137	4	Yes	16	20	36	None	10.
138	5	Yes	250		200	10.	10.
139	4	No (s)	150		150	None	10.
140	4	No	250		250	10.	10.
141	5	No	30	4	34	None	10.
142	5	No	50		50	None	10.
143	3	Yes	3	90	93	9.	10.
144	5	No	20		20	None	10.
145	3	No	200		200	3.	10.
146	4	No	40		40	None	10.
147	3	No	50		50	5.	10.
148	4	No	90	17	107	None	10.
149	3	No	53		53	None	10.
150	4	No	37	6	43	None	10.
151	4	No (f)	13		17	None	10.
152	2	No	101	4	101	None	10½.
153	5	No	20		20	None	10.
154	4	No	4	30	34	2.	10.
155	3	No	14	6	20	2.	10.
156	2	No	2	4	6	None	10.
157	7	No	175		175	5.	10.
158	3	Yes	15	15	30	None	10.
159	4	Yes (f)	12	20	32	None	10.
160	3	Yes	25	85	110	None	10.
161	1	No	10		10	None	10.
162	5	Yes	25	8	33	None	10.
163	2	No	30		30	None	9.
164	3	Yes	35	80	115	None	10.
165	3	Yes	25	75	100	5.	10.
166	5	No	350		350	None	10.
167	4	No	13	39	52	1.	9.
168	2	No	2		2	None	9½.
169	4	Yes	31			1.	10.
170	2	No	(N)			None	10.
171	3	No	13	17	30	None	9.
172	3	No	110		110	2.	10.
173	2	No	50		50	None	11.
174	3	No	100	135	135	10.	10.
175	3	No	80	45	75	6.	10.
176	4	No	50		50		10.
177	1		85		85		10.
178	1	No	35	15	50	6.	10.
179	4	No	7	25	32	None	10.
180	2	No	75	75	150	None	10.
181	4	No	175	175	350	None	10.
182	3	No	8		8	None	10.
183	3	No	40	12	52	None	10.
184	4	Yes	45		45	None	10.
185	1	No	15		15	None	10.
186	1	No	15		15	1.	10.
187	6	Yes	350		350	None	10.
188	3	No	5		5	None	10.
189	4	No	(o) 150		150	None	10.
190	2	No	40		40	None	10.
191	2	No	20	50	70	6.	10.
192	3	No	16	3	19	1.	10.
193	4	Yes	205	150	355	20.	10.
194	3	No	8	4	12	None	10.
195	2	No	12	5	17	None	10.
196	2	No (f)	30	20	50	None	10.
197	2	No	6		6	None	9.
198	2	No	15		15	None	10.
199	2	No	50	90	140	None	10.

-CONTINUED.

Establishment number.	Motive power used.	Accidents to employes, number wounded.	BOILER INSPECTION.		
			By boiler-maker.	By engineer.	How often.
128	Electric	None			
129	Steam	None (h)	Yes		Quarterly.
130	Steam	None	Yes		Quarterly.
131	Steam	None	Yes		Quarterly.
132	Steam	None	Yes		Quarterly.
133	Gasoline	None			
134	Steam	None	Yes		Quarterly.
135	Electric	None			
136	Steam	None	Yes		Quarterly.
137	Steam	None	Yes		Quarterly.
138	Steam	None	Yes		Quarterly.
139	Steam	None (a)	Yes		Quarterly.
140	Steam	1 (h)	Yes		Quarterly.
141	Gas	None			
142	None	None			
143	None	None			
144	Steam	None	Yes		Regularly.
145	Steam	None	Yes		Regularly.
146	Steam	None	Yes		Regularly.
147	Steam	None	Yes		Regularly.
148	Steam	None	Yes		Regularly.
149	Steam	None	Yes (i)		Regularly.
150	Steam	None	Yes		Regularly.
151	Steam	None	Yes		Regularly.
152	Steam	None	Yes		Regularly.
153	Steam	None	Yes		Regularly.
154	Electric	None			
155	Steam	None	Yes		Regularly.
156	Electric	None	Yes		Regularly.
157	Steam	None	Yes		Regularly.
158	Steam	None	Yes		Regularly.
159	Electric	None			
160	Electric	None			
161	Electric	None			
162	Steam	None	Yes		Regular.
163	Steam	None	Yes		Regular.
164	Steam	None	Yes		Regular.
165	Steam	None	Yes		Regular.
166	Steam	None	Yes		Regular.
167		None			
168	Electric	None			
169	Electric	None			
170	Steam	None		Yes (e)	Regular.
171		None			
172	Hydraulic	None	Yes		
173	Steam	None	Yes		Regular.
174	Steam	None	Yes		Regular.
175	Steam	None	Yes		Regular.
176	Steam	None	Yes		Regular.
177	Steam	None	Yes		Regular.
178	Steam	None	Yes		Regular.
179	Electric	None			
180	Steam	None	Yes		Regular.
181	Steam	None	Yes		Regular.
182	Steam	None	No	No	
183	Steam	None	No	No	
184	Steam	None	Yes		Regular.
185	Steam	None	Yes		Regular.
186	Steam	None	Yes		Regular.
187	Steam	None	Yes		Regular.
188	Gasoline	None			
189	Steam	None	Yes		Regular.
190	Steam	None	Yes		Regular.
191	Steam	None	(l)		
192					
193	Steam	None	Yes		Regular.
194	Steam	None	Yes		Regular.
195	Electric	None			
196	Steam	None	Yes		Regular.
197	Steam	None	Yes		(l).
198	Steam	None	No		
199	Steam	None	No		

TABLE No. 1

Establishment number.	Number of stories in factory.	Are fire escapes provided.	NUMBER OF EMPLOYEES.			Number of children under 14 years.	Hours worked per day.
			M.	F.	Total.		
200	3	No	18		18	None	10.
201	3	No	7	135	142	None	10.
202	2	No	25		25	None	10 (P)
203	3	No	9	20	29	1	9.
204	1	No	10	5	15	5	10.
205	3	No	10		10	None	10.
206	1	No	7		7	None	8.
207	1	No	2	3	5	None	10.
208	1	No	5	7	12	None	10.
209	1	No	200		200	None	10.
210	1	No	4	4	8	None	10.
211	3	No	60	20	80	None	10.
212	1	No	4		4	None	10.
213	1	No	3		3	None	10.
214	6	No (f)	70	115	185	None	10.
215	2	No	35		100	None	10.
216	4	No	14	4	18	None	10.
217	1	No	6		6	None	10.
218	1	No	13	12	25	None	10.
219	2	No	80		80	None (c)	10.
220	1	No	40		40	None (c)	10.
221	1	No	2		2	None	10.
222	2	No	2	35	37	None	10.
223	2	No	8	3	11	1	8.
224	1	No	15		15	1	10.
225	1	No	20		20	1	10.
226	1	No	6		6	None	12.
227	1	No	5		5	None (c)	9.
228	2	No	6		6	1	10.
229	1	No	12		12	1	10.
230	1	No	4		4		10.
231	1	No	8	1	9		10.
232	1	No	16		16		10.
233	1	No	6		6	1	10.
234	2	No	2	12	14	None	10.
235	1	No	3		3	None	12.
236	1	No	3		3	None	10.
237	2	No	3		3	None	9.
238	2	No	18		18	None	9.
239	2	No	11		11	None	9.
240	2	No	10		10	None	10.
241	1	No	17		17	None	10.
242	6	Yes	600	200	900	35 (c)	10.
243	1	No	15		15	None	10.
244	5	No	12		12	None	10.
245	3	No	600	10	700	70	10.
246	4	Yes	30	35	115	10	10.
247	3	No	30	20	60	None	10.
248	2	Yes	3		3	None	10.
249	1	No	2		2	None	10.
250	2	No	100		100	6	10.
251	4	No	15		15	None	10.
252	2	No	8	40	48	None	10.
253	1	No	8		8	2	10.
254	1	No	60		60	None	9.
255	3	No	25	30	55	None	10.
256	2	No	19		19	None	10.
257	2	No	15		15	None	10.
258	3	No	50		50	2	10.
259	2	No	15		15	None	10.
260	2	No	18		18	2	10.
261	3	No	60		60	None	10.
262	2	No	350		350	None	8.
263	1	No	3	40	43	None	10.
264	3	Yes	52	8	60	8	10.
265	2	No	100	40	140	30 (c)	10.
266	2	No	265	35	300	8	10.
267	2	No	34	4	38	None	10.
268	1	No			(N)	None	10.
269	4	No	478		478	None	10.
270	4	No	100		100	None	10.
271	1	No	4		4	None	10.

-CONTINUED.

Establishment number.	Motive power used.	Accidents to employees, number wounded.	BOILER INSPECTION.		
			By boiler-maker.	By engineer.	How often
200	Steam	None	No		
201	Steam	None	No		
202	Electric	None			
203	Electric	None			
204	Steam	None	No		
205		None			
206		None			
207	Steam	None			
208	Steam	None	Yes		Regular.
209	Steam	None	Yes		Regular.
210	Gasoline	None			
211		None			
212		None			
213		None			
214	Steam	None	Yes		Regular.
215	Steam	None	Yes		Regular.
216		None			
217	Steam	None	Yes		Regular.
218	Steam	None	Yes		Regular.
219	Steam	None	Yes		Regular.
220	Steam	None	Yes		Regular.
221	Steam	None	No		
222	Gasoline	None			
223		None			
224	Steam	None			
225	Electric	None			
226	Steam	None			
227	Steam (e)	None			
228	Steam	None	No		
229	Steam	None	No		
230					
231					
232					
233					
234	Steam	None			
235	Steam	None			
236	Steam	None			
237	Steam	None			
238	Steam	None	No		
239	Steam	None	Yes		Regular.
240	Water	None			
241	Water	None			
242	Steam	None	Yes		Regularly.
243	Steam	None	Yes		Regularly.
244	Steam	None	Yes		Regularly.
245	Steam	None	Yes		Regularly.
246	Steam	None	Yes		Regularly.
247	Steam	1 (w)	Yes		Regularly.
248	Steam	None	Yes		Regularly.
249	Steam	None	Yes		Regularly.
250	Steam	None	No	No	
251	Steam	None	Yes		Regularly.
252	Steam	None	Yes		Regularly.
253	Steam	None	Yes		Regularly.
254	Gasoline	None			
255	Steam	None	(s)		
256	Electricity	None			
257	Steam	1 (s)			
258	Gasoline	None	No		
259	Steam	None	Yes		Regularly.
260					
261	Steam	None	Yes		Regularly.
262	Steam	None	Yes		Regularly.
263	Steam	3	Yes		Regularly.
264	Electricity	None			
265					
266	Steam	1 (h)	No	No	
267	Steam	None	Yes		Regularly.
268	Steam	1 (h)	Yes		Regularly.
269	Steam	None	Yes		Regularly.
270	Steam	None	Yes		Regularly.
271	Steam	None	Yes		Regularly.

TABLE No. 1

Establishment number.	Number of stories in factory.	Are fire escapes provided.	NUMBER OF EMPLOYEES.			Number of children under 14 years.	Hours worked per day.
			M.	F.	Total.		
272	1	No	15		15	None	10
273	1	No	4	4	8	None	10
274	(N)	No	3		3	None	10
275	2	No	15		15	None	10
276	1		2		2		10
277	2	No	13	5	18	2	10
278	3	Yes	360	1	361	20	10
279	1	No	13	5	18	3	9
280	3	Yes	700	2	702	20	10
281	1		400		400	None	10
282	3	No	35		35	None	10
282	3	No	10	6	22	None	9
284	3	No	50	25	75	None	10
285	2	No	4		4	None	8
286	1	No	12		12	None	10
287	2	No	20	2	22	5	9
288	2	No	18	4	22	6	10
289	1		100		100	None	10
290	3	No	60	2	62	None	9
291	2	No	11	2	13	None	9
292	2	No	25	100	125	2	10
293	1	No	2		2	None	10
294	3	No	248		248	10	10
295	2	No	4		4	None	10
296	2	No	50		50	None	10
297	1	No	12		12	None	10
298	2	No	15	25	40	None	10
299	2	No	272		272	None	10
300	1	No	12		12	2	10
301	1	No	24		24	None	10
302	4	No	60	63	123	6	10
303	2	No	30	95	125	None	10
304	3	No	30	2	32	None	9
305	2	No	12	2	14	None	10
306	1	No	5		5	None	10
307	3	No	35	1	36	1	10
308	1	No	(n)				
309	2	No	30		30	2	10
310	2	No	8		8	1	10
311	4	(f)	25		25	None	10
312	2	No	4		4	1	10
313	1	No	(n)			8	10
314	1	No	30		30	None	10
315	2	No	30		30	2	10
316	3	No	8		8	None	10
317	1	No	15		15	2	10
318	3	No	6		6	None	10
319	2	No	3		3	None	10
320	2	No	6		6	2	10
321	1	No	11		11	2	10
322	1	No	40		40	4	10
323	2	No	25		25	3	10
324	1	No	60		60	3	10
325	2	No	35		35	None	10
326	2	No	38		38	4	10
327	2	No	7		7	None	10
328	2	No	250		250	None	10

The number killed are omitted from the tabulation. The fact that we have only 8 deaths emphasizes the necessity of some county official in each county being required by law to report

-CONTINUED.

Establishment number.	Motive power used.	Accidents to employees, number wounded.	BOILER INSPECTION.		
			By boiler-maker.	By engineer.	How often.
272	Steam	None	Yes		Regularly.
273	Steam	None	Yes		Regularly.
274	Steam	None	Yes		Regularly.
275	Steam	None	No	Yes	Regularly.
276					
277	Electricity	None	No	No	
278	Steam	15 (h)	Yes		Quarterly.
279	Electricity	None			
280	Steam	12 (h)	Yes		Quarterly.
281	Steam	Yes (n)	Yes		Weekly.
282	Electricity	None			
283	Steam	None	Yes		Bi-monthly.
284	Steam	Yes (h)	Yes		Weekly.
285					
286	Steam	3 (h)	Yes		Monthly.
287	Steam	10 (h)	Yes		Monthly.
288	Electricity	None			
289	Steam	None	Yes		Monthly.
290	Steam	None		Yes	Occasionally.
291	Steam and Electr.	None	No	No	(1)
292	Electricity	None			
293	Steam and Electr.	None	Yes		Quarterly.
294	Steam	10 (h)		Yes	Monthly.
295	Steam	None		Yes	Bi-monthly.
296	Gasoline	None			
297	Steam and Electr.	None			
298	Steam	None		Yes	Monthly.
299	Steam	5 (h)		Yes	Bi-monthly.
300	Steam	None		Yes	(1)
301	Steam	None		Yes	Monthly.
302	Steam	None		Yes	Bi-monthly.
303	Steam	None		Yes	Bi-monthly.
304	Gasoline	None			
305	Steam	None		Yes	Monthly.
306		None			
307	Steam	None	Yes		Monthly.
308					
309	Steam	6 (h)	Yes		Regularly.
310					
311	Electricity	None			
312					
313	Steam	(n)	Yes	Yes	Bi-monthly.
314	Steam	4 (h)	Yes		Occasionally.
315	Steam	(n)	Yes		Occasionally.
316	Turbine	None			
317	Steam	Yes (h)			
318	Turbine and Steam	None			
319	Steam	None	Yes		
320	Steam (s)	None			Monthly.
321	Gasoline	3 (h)			
322	Steam	5 (h)	Yes	Yes	Monthly.
323	Gas and Steam				
324	Gas	4 (h)			
325	Gas and Steam	3 (h)	Yes		After using.
326	Steam		Yes		After using.
327	Steam	None	Yes		Regularly.
328	Steam	None	Yes		Bi-monthly.

by accident recorded, viz: 5 from boiler explosion, 2 from set screws and 1 from a circular saw,
all deaths by accident to this bureau.

FACTORY

TABLE

Precautions against accident,

Establishment number.	STAIRWAYS.			ELEVATORS.		Are belt shifters used?
	Number inside.	Number outside.	Hand rails provided.	Number.	Openings protected.	
1	1	None	No	None		Yes
2	1	None	Yes	1	Yes	Yes
3	2	None	Yes	1	Yes	Yes
4	2	None	Yes	None		Yes
5	2	None	Yes	None		Yes
6	None	1	1	None		Yes
7	1	None	Yes	None		Yes
8	1	None	Yes	None		Yes
9	1	1	Yes	None		Yes
10	1	1	No	1	No	Yes
11	1	None	Yes	None		Yes
12	1	None	Yes	1	Yes	Yes
13	1	None	Yes	None		Yes
14	3	None	Yes	2	No	Yes
15	1	None	Yes	None		Yes
16	1	None	Yes	None	Yes	Yes
17	2	None	Yes	None		Yes
18	None			None		Yes
19	2	None	Yes	None		Yes
20	1	None	Yes	None		Yes
21	(s)			1	Yes	
22	1		Yes	1	Yes	Yes
23	4	2	Yes	None		Yes
24	1	None	Yes	1	Yes	
25	3	None	No	1	No	Yes
26	1	None	Yes	1	No	Yes
27	4	None	Yes	4	Yes	
28	None	None		None		Yes
29	1	None	Yes	None		No
30	3	None	No	1	Yes	Yes
31	4	None	Yes	1(*)	No	Yes
32	2	None	Yes	1	Yes	Yes
33	2	None	Yes	1	Yes	Yes
34	1	None	Yes	1	Yes	Yes
35	None	None	No	None		Yes
36	2	None	Yes	None		Yes
37	None	None		None		Yes
38	2	None	Yes	1	Yes	Yes
39	1	None	Yes	3	Yes	Yes
40	2	None	No	None		Yes
41	2	2	Yes	1	Yes (e)	Yes
42	1	None	Yes	1	Yes	Yes
43	None	None		None		
44	None	None		None		
45			Yes	None		Yes
46	2	None	Yes	2	Yes	Yes
47	1	None	Yes	None		Yes
48	1	None	Yes	None		
49	None	None		None		Yes
50	(s) 2	None	Yes	5	Yes	Yes
51	5	None	Yes	8	No	Yes
52	1	None	Yes	1	No	Yes
53	1	None	Yes	1	No	Yes
54	2	None	Yes	1	Yes	Yes

INSPECTION.

No. 2.

and sanitary equipment.

Establishment number.	Are saws, gearing, wheels, etc. guarded?	Are dust blowers provided?	Ventilation of factory.	Are water closets provided?	Are separate water closets provided for females?	Are closets cleanly?
1	Yes	No	Fair	Yes		No.
2	Yes	Yes	Good	Yes	Yes	Yes.
3	Yes	Yes	Good	Yes	Yes	Yes.
4	No	No	Good (v)	Yes	Yes	Yes.
5	Yes (a)	No	Poor	Yes (f)		No.
6	Yes	No	Fair	No		
7	Yes	No	Fair	No		
8	No (d)	No	Fair	Yes	Yes	Yes.
9	Yes	No	Good (f)	Yes	Yes	Yes.
10	Yes	No	Fair	No		No (c).
11	Yes	No	Good	Yes		Yes.
12	Yes	No	Good	Yes		Yes.
13	Yes	No	Fair	Yes		No.
14	Yes	No	Fair	Yes	Yes	Yes.
15	Yes	No	Good	Yes	Yes	Yes.
16	Yes	No	Good	Yes	Yes	Yes.
17	Yes	No	Good	Yes		Yes.
18	Yes	No	Good	Yes		
19	Yes	No	Good	Yes	Yes	Yes.
20	Yes	No	Good	Yes	Yes	No.
21	(a)			Yes		Yes.
22	Yes	No	Good	Yes	Yes	Yes.
23	Yes	No	Poor	Yes	Yes	Yes.
24			Good	Yes	Yes	Yes.
25	Yes	No	Fair	Yes		No.
26	Yes	Yes	Yes	Yes		No.
27		Yes	Yes	Yes	Yes	Yes.
28	Yes	No	Fair	No		No.
29	Yes	No	Fair	Yes	Yes	No.
30	Yes	Yes	Good	Yes	Yes	Yes.
31	Yes	Yes	Good	Yes		Yes.
32	Yes	Yes	Good	Yes	Yes	Yes.
33	Yes	Yes	Good	No		No (w).
34	Yes	No	Good	Yes		Yes.
35	Yes	No	Bad	Yes	No	No.
36	No	No	Good	Yes	Yes	No (w).
37	No	No	Good	No		No.
38	Yes	No	Good	Yes	Yes	Yes.
39	Yes	No	Fair	Yes		No.
40	No	No	Good	No		
41	Yes	No	Good	Yes	Yes	No.
42	Yes	No	Fair	Yes		Yes.
43		No	Fair	Yes		Yes.
44		No	Fair	Yes		Yes.
45	Yes		Good	Yes	No	Yes.
46	Yes	No	Good	Yes	Yes	Yes.
47	Yes	No	Good	Yes		No.
48			Good	Yes		No.
49	Yes		Good	Yes		No.
50	No	No	Fair	Yes		No.
51	Yes	No	Fair	Yes	Yes	No.
52	No	No	Poor	Yes		No.
53	Yes	No	Poor	Yes	Yes	No.
54	Yes	No	Good	Yes		Yes.

TABLE No. 2

Establishment number.	STAIRWAYS.			ELEVATORS.		Are belt shifters used.
	Number inside.	Number outside.	Hand rails provided.	Number.	Openings protected.	
55	1	None	Yes	None		Yes
56	None	1	Yes	None		Yes
57	None	None		None		
58	1	None	Yes	None		Yes
59	2	None	Yes	1	Yes	Yes
60	1	None	Yes	2	Yes	
61	None	None		None		Yes
62	(g) 1	None	Yes	2	Yes	Yes
63	2	None	Yes	1	Yes	Yes
64	None	None		None		Yes
65	1	None	No	None		Yes
66	1	None	Yes	1	Yes	Yes
67	1		Yes	1	Yes	Yes
68	1	None	Yes	None		Yes
69	1	1	No	None (e)		Yes
70	1	1	Yes	None		Yes
71	1	None	Yes	None		Yes
72	None	None		None		Yes
73	1	None	Yes	2	Yes	Yes
74	1	None	Yes	2	Yes	Yes
75	1	None	Yes	None		Yes
76	2	None	No	None		Yes
77	1	None	Yes	1	Yes	Yes
78	None	None		None		Yes
79	None	None		None		Yes
80	1	None		1	Yes	Yes
81	1	None	Yes	None		Yes
82	1	None	Yes	None		Yes
83	2	None	Yes	5	Yes	Yes
84	1	None	Yes	1	Yes	Yes
85	1	1	Yes	None		Yes
86	None	None		None		Yes
87	None	None		None		Yes
88	None	None		None		Yes
89	None	None	Yes	None		Yes
90	None	None		None		Yes
91	1	None		None		Yes
92	None	None		None		Yes
93	1	None	No	2	Yes	Yes
94	1	None	Yes	1	Yes	Yes
95	1	None	Yes	None		
96	1	None	Yes	None		
97	1	None	Yes	None		
98	1	None	Yes	None		
99	2	None	Yes	1	Yes	Yes
100	(s)	None		3	Yes	Yes
101	1	None	Yes	1	No	Yes
102	2	None	No	None		Yes
103	1	None	Yes	None		Yes
104	None	None		None		Yes
105	None	None		None		Yes
106	None	None		None		Yes
107	None	None		None		Yes
108	None	None		None		Yes
109	2	None	No	0	No	Yes
110	None	None		None		Yes
111	1	None	Yes	None		Yes
112	None	1	Yes			Yes
113	1	None	Yes	None		
114	1	None	Yes	None		Yes
115	1	None	Yes	None		Yes
116	2	None	Yes	1	Yes	Yes
117	2	1	Yes	None		Yes
118	1	None	Yes	(E)	Yes	Yes
119	1	None	Yes	None		Yes
120	None	None		None		Yes
121	1	None	Yes	2	Yes	Yes
122	1	None	Yes	None		Yes
123	1	None	Yes	None		Yes
124	None	None		None		Yes
125	2	None	None	2	Yes	Yes

-CONTINUED-

Establishment number.	Are saws, planing, etc., guarded?	Are dust blowers provided?	Ventilation of factory.	Are water closets provided?	Are separate water closets provided for females?	Are closets cleanly?
55	Yes	No	Fair	No		
56	Yes	No	Good	Yes	Yes	Yes.
57			Poor	No		No.
58	Yes	Yes	Fair (v)	Yes		No.
59	Yes	No	Good	Yes		No.
60			Good	Yes	Yes	Yes.
61	Yes	No	Good	Yes	Yes	Yes.
62	Yes	No	Fair	Yes	Yes	Yes.
63	Yes	No	Good	Yes	Yes	No.
64	Yes	No	Fair	Yes		No.
65	Yes	No	Fair	Yes		No.
66	Yes	No	Good	Yes		Yes.
67	No	No	Good	Yes		Yes.
68	Yes	No	Good	Yes		No.
69	No	No	Poor	No	No	No.
70	Yes	No	Good	Yes		Yes.
71	Yes	No	Fair	No		No.
72	No	No	Fair	No		No.
73	Yes	No	Good	Yes	Yes	Yes.
74	Yes	No	Yes	Yes	Yes	Yes.
75	Yes	No	Fair	No		No.
76	No	No	Fair	Yes		No.
77	Yes	No	Poor	Yes		Yes.
78	No	No	Good	Yes		Yes.
79	Yes	No	Good	Yes	Yes	Yes.
80	No	No	Good	No		Yes.
81	Yes	No	Good	Yes		No.
82	Yes	No	Good	Yes		Yes.
83	No	No	Good	Yes		Yes.
84	Yes	No	Good	Yes	Yes	No.
85	No	No	Good	Yes		No.
86	No	No	Fair	Yes		No.
87	No	No	Good	Yes		Yes.
88	Yes	No	Good	Yes		Yes.
89	No	No	Good	No (x)		No.
90	No	No	Good	Yes	Yes	No.
91	No	No	Fair	Yes		No.
92	No	No	Fair	No (w)		No.
93	Yes	No	Good	Yes	Yes	No.
94			Fair	Yes	No (w)	Yes.
95			Good	Yes	Yes	Yes.
96			Good	Yes	Yes	Yes.
97			Good	Yes	Yes	Yes.
98			Fair	Yes	No	No.
99			Fair	Yes	Yes	No.
100	Yes	No	Poor	Yes	Yes	No.
101	No	No	Good	Yes		No.
102	No	No	Fair	No		
103	Yes	No	Fair	Yes		Yes.
104	No	No	Good	Yes		No.
105	No	No	Good	Yes		No.
106	No	No	Fair	No	No	No.
107	Yes	No	Fair	No		No.
108	No	No	Fair	No		
109	No	No	Fair	No		
110	No	No	Fair	No		
111	Yes	No	Poor	No		
112	No	No	Fair	Yes	No	No.
113	Yes	No	Fair	Yes	No	No.
114	No	No	Good	Yes		No.
115	No	No	Fair	Yes	Yes	Yes.
116	No	No	Fair	Yes	No	Yes.
117	No	No	Bad	Yes	Yes	Yes.
118	No	No	Good	Yes	No	No.
119	Yes	No	Good	Yes	No	No.
120	Yes	No	Good	Yes		Yes.
121	Yes	Yes	Good	Yes		No.
122	Yes	No	Good	Yes		No.
123	Yes	No	Good	Yes		No.
124	No	No	Good	Yes		Yes.
125	Yes	No	Good	Yes	Yes	Yes.

TABLE No.

Establishment number.	STAIRWAYS			ELEVATORS.		Are belt Shifters used?
	Number inside.	Number outside.	Hand rails provided.	Number.	Openings protected?	
126	None	None				Yes
127	1	None	Yes	2	Yes	Yes
128	1	1	Yes	1	Yes	Yes
129	1	None	Yes	2	Yes	Yes
130	1	None	Yes	1	Yes	Yes
131	1	None	Yes	1	Yes	Yes
132	2	None	Yes	1	Yes	Yes
133	1	None	Yes	1	Yes	Yes
134	2	None	Yes	1	No	Yes
135	1	1	Yes	1	No	Yes
136	None	None		(f) 1	No	Yes
137	1	None	Yes	1	Yes	Yes
138	3	None	Yes	3	Yes	Yes
139	1	None	Yes	1	Yes	Yes
140	3	None	Yes	3	Yes	Yes
141	2	None	Yes	1	Yes	Yes
142	1	1	Yes	1	Yes	
143	1	None	Yes	1	Yes	
144	1	None	Yes	1	Yes	Yes
145	1	None	Yes	2	Yes	Yes
146	1	None	Yes	1	Yes	Yes
147	1	None	Yes	1	Yes	Yes
148	2	None	Yes	2	Yes	Yes
149	1	None	Yes	1	No	Yes
150	1	None	Yes	1	Yes	Yes
151	2	None	Yes	1	Yes	Yes
152	1	None	None	(w) 1	No	Yes
153	1	None	Yes	1	Yes	Yes
154	1	None	Yes	1	Yes	Yes
155	1	None	Yes	1	Yes	Yes
156	1	None	Yes	None		Yes
157	(s)	None	Yes	1	(e)	Yes
158	1	None	Yes	1	Yes	Yes
159	1	None	Yes	3	(e)	Yes
160	1	None	Yes	1	Yes	Yes
161	None	None		None		Yes
162	1	None		1	Yes	Yes
163	1	None	No	None		Yes
164	2	None	Yes	1	Yes	Yes
165	1	None	Yes	(f) 1	Yes	Yes
166	12	None	Yes	(f) 6	Yes	Yes
167	1	None	Yes	1	Yes	
168	1	None	Yes	None		Yes
169	1	None	Yes	1	Yes	Yes
170	1	None	Yes	1		Yes
171	2	None	Yes	1 (h)	Yes	
172	6	None	Yes	4	Yes	Yes
173	1	None	Yes	None		Yes
174	1	None	Yes	1 (h)	Yes	Yes
175	2	None	Yes	None		Yes
176	(s)	None		1	Yes	Yes
177	None	None		None		Yes
178	None	None		None		Yes
179	2	None	Yes	1	Yes	Yes
180	1	None	Yes	None		Yes
181	3	None	Yes	1	Yes	Yes
182	1	None	No	1	No	Yes
183	1	None	Yes	1	No	Yes
184	2	None	Yes	1	Yes	Yes
185	None	None		None		Yes
186	None	1	Yes	None		Yes
187	(d)	None	Yes	2	Yes	Yes
188	1	None	Yes	None		Yes
189	2	None	Yes	1	Yes	Yes
190	2	None	Yes	1	Yes	Yes
191	1	None	Yes	1	Yes	Yes
192	1	None	No			
193	2	None	Yes	1	Yes	Yes
194	1	None	Yes	1	No	Yes
195	1	None	Yes	None		Yes
196	1	None	Yes	2	Yes	Yes

2—CONTINUED.

Establishment number.	Are saws, gearing, wheels, etc., guarded?	Are dust blowers provided?	Ventilation of factory.	Are water closets provided?	Are separate water closets provided for females?	Are closets cleanly?
126	No	No	Good	Yes	No	No.
127	Yes	No	Good	Yes	Yes	Yes.
128	Yes	No	Good	Yes	Yes	Yes.
129	Yes	No	Fair	Yes	No	No.
130	Yes	No	Good	Yes	Yes	No.
131	Yes	No	Good	Yes	Yes	Yes.
132	Yes	No	Good	Yes	Yes	Yes.
133	No	No	Fair	Yes	Yes	No.
134	Yes	No	Fair	Yes	Yes	No. (w)
135	Yes	No	Fair	Yes	Yes	No.
136	No	No	Good	Yes	No	No.
137	No	No	Good	Yes	Yes	Yes.
138	Yes	No	Good	Yes	No	No.
139	No	No	Fair	Yes	No	No.
140	Yes	Yes	Good	Yes	Yes	Yes.
141	Yes	No	Good	Yes	No	Yes.
142	Yes	No	Good	Yes	No	No.
143	Yes	No	Good	Yes	No	No.
144	Yes	No	Fair	Yes	No	No.
145	Yes	No	Fair	Yes	No	No.
146	Yes	No	Good	Yes	No	No.
147	No	No	Good	Yes	No	No.
148	Yes	No	Good	Yes	Yes	Yes.
149	Yes	No	Good	Yes	Yes	Yes.
150	Yes	No	Good	Yes	Yes	Yes.
151	Yes	No	Good	Yes	Yes	Yes.
152	Yes	No	Good	Yes	Yes	No.
153	No	No	Good	Yes	No	No.
154	No	No	Good	Yes	Yes	Yes.
155	No	No	Good	Yes	Yes	Yes.
156	Yes	No	Good	Yes	Yes	Yes.
157	Yes	No	Good	Yes	Yes	Yes.
158	No	No	Good	Yes	Yes	Yes.
159	No	No	Good	Yes	Yes	Yes.
160	Yes	No	Good	Yes	Yes	Yes.
161	Yes	No	Good	Yes	Yes	Yes.
162	No	No	Good	Yes	Yes	Yes.
163	Yes	No	Good	Yes	Yes	Yes.
164	Yes	No	Good	Yes	Yes	Yes.
165	No	No	Good	Yes	Yes	Yes.
166	Yes	No	Good	Yes	Yes	Yes.
167	Yes	No	Good	Yes	Yes	Yes.
168	Yes	No	Good	Yes	Yes	Yes.
169	Yes	Yes	Good	Yes	Yes	Yes.
170	No	Yes	Good	Yes	Yes	Yes.
171	Yes	No	Good	Yes	Yes	Yes.
172	No	No	Good	Yes	Yes	Yes.
173	No	No	Good	Yes	Yes	No.
174	No	No	Good	Yes	Yes	Yes.
175	No	No	Good	Yes	Yes	Yes.
176	Yes	No	Good	Yes	Yes	Yes.
177	No	No	Good	Yes	Yes	No.
178	No	No	Good	Yes	Yes	Yes.
179	Yes	No	Good	Yes	Yes	Yes.
180	Yes	No	Good	Yes	Yes	Yes.
181	Yes	No	Good	Yes	Yes	Yes.
182	Yes	No	Good	Yes	Yes	Yes.
183	No	No	Good	Yes	Yes	No.
184	Yes	No	Good	Yes	Yes	Yes.
185	Yes	No	Good	Yes	Yes	Yes.
186	No	No	Good	Yes	Yes	No.
187	Yes	No	Fair	Yes	Yes	No.
188	No	No	Good	Yes	Yes	Yes.
189	Yes	No	Good	Yes	Yes	Yes.
190	Yes	No	Good	Yes	Yes	Yes.
191	Yes	No	Good	Yes	Yes	Yes.
192	Yes	No	Bad	Yes	Yes	Yes.
193	Yes	Yes	Good	Yes	Yes	No.
194	No	No	Fair	Yes	Yes	Yes.
195	Yes	No	Good	Yes	Yes	Yes.
196	Yes	No	Good	Yes	Yes	No.

TABLE No.

Establishment number.	STAIRWAYS			ELEVATORS.		Are belt shifters used.
	Number inside.	Number outside.	Hand rails provided.	Number.	Openings protected.	
197	1.	None	Yes	None		Yes
198	1	None	Yes	None		Yes
199	1.	None	Yes	1	(h)	Yes
200	1.	None	Yes	1	Yes	Yes
201	1.	None	Yes	1.	Yes	Yes
202	1.	None	No	None		Yes
203	1.	None	Yes	1 (F)	Yes	Yes
204	None	None		None		Yes
205	1.	None	No			Yes
206	None	None		None		
207	None	None		None		Yes
208	None	None		None		Yes
209	None	None		None		Yes
210	None	None		None		Yes
211	None	None		1.	No.	Yes
212	None	None		None		
213	None	None		None		
214	1.	None	Yes	None		Yes
215	2.		Yes	None		Yes
216	1	None	Yes	None		
217	None	None		None		Yes
218	None	None		None		Yes
219	1	None	Yes	1.	Yes	Yes
220	None	None		None	Yes	Yes
221	None	None		None		Yes
222	1.	None		1.	Yes	Yes
223	1.	None	Yes	None		
224						Yes
225	None	None		None		Yes
226	None	None		None		Yes
227	None	None		None		Yes
228	1.	None	Yes	None		Yes
229	None	None		None		Yes
230	None	None		None		
231	None	None		None		
232	None	None		None		
233	None	None		None		
234	1.	None	Yes	1 (H)	Yes	Yes
235	None	None		None		Yes
236	None	None		None		Yes
237	1.	None	None	None		Yes
238	1.	None	Yes	None		Yes
239	1.	None	Yes	None		Yes
240	1	None	Yes	1.	Yes	Yes
241	None	1	Yes	None		Yes
242	5.	None	Yes	3.	Yes	Yes
243	None	None		None		Yes
244	4.	None	Yes	1.	Yes	Yes
245	(s)	None		(3)		Yes
246	2.	None	Yes	1.	Yes	Yes
247	1.	None	Yes	1.	Yes	Yes
248	1.	None	Yes	None		Yes
249	None	None		None		Yes
250	1.	None	Yes	1 (I)	Yes	Yes
251	1.	None	Yes	1 (I)	Yes	Yes
252	1.	None	Yes	1 (I)	Yes	Yes
253	None	None		None		Yes
254	None	None		None		Yes
255	None	None		1.	Yes	Yes
256	1.	None	Yes	None		Yes
257	1.	None	Yes	None		Yes
258	1.	None	Yes	1	Yes	Yes
259	1.	None	Yes	None		Yes
260	1.	None	Yes	1	Yes	Yes
261	1.	None	Yes	(F) 1	Yes	Yes
262	1	None	Yes	None		Yes
263	(s) 1.	None	Yes	None		Yes
264	1.	None	Yes	1.	Yes	
265	1.	None	No	1.	Yes	Yes
266	1	None	Yes	None		Yes
267	1.	1.	No	None		Yes

2—CONTINUED.

Establishment number.	Are saws, gearing, wheels, etc., guarded?	Are dust blowers provided?	Ventilation of factory.	Are water closets provided?	Are separate water closets provided for females?	Are closets cleanly?
197	Yes	No	Good	Yes		Yes.
198	No	No	Fair	Yes		No.
199	No	No	Good	Yes	Yes	Yes.
200	Yes	No	Good	Yes		Yes.
201	Yes	No	Good	Yes		No.
202	Yes	No	Fair	Yes		No.
203	Yes	No	Good	Yes	Yes	Yes.
204	No	No	Bad	Yes		No.
205	Yes	No	Poor	Yes		No.
206			Good	Yes		Yes.
207	Yes	No	Good	Yes		Yes.
208	Yes	No	Good	Yes		Yes.
209	No	No	Good	Yes		No.
210	Yes	No	Fair	Yes	No	No.
211	Yes	No	Poor	Yes	Yes	No.
212			Fair	Yes		No.
213			Good	Yes		Yes.
214	Yes	No	Fair	Yes	Yes	No.
215	Yes	No	Fair	Yes	Yes	No.
216			Good	Yes	Yes	Yes.
217	No	No	Fair	Yes		No.
218	No	No	Fair	Yes	Yes	No.
219	No	No	Good	Yes		Yes.
220	No	No	Fair	Yes		Yes.
221	No	No	Fair	Yes		No.
222	Yes	No	Good	Yes	Yes	Yes.
223			Fair	Yes	No	No.
224	Yes	No	Good	Yes (p)		
225	No	No	Good	No		
226	No	No	Good	No		
227	No	No	Fair	No		
228	No	No	Good	Yes		Yes.
229	No	No	Fair	Yes		No.
230			Fair	Yes		No.
231			Good	Yes	Yes	Yes.
232			Good	Yes		Yes.
233			Good	No		
234	No	No	Fair	Yes	Yes	Yes.
235	No	No	Fair	No		
236	No	No	Fair	No		
237	No	No	Good	Yes		Yes.
238	No	No	Good	Yes		Yes.
239	No	No	Fair	Yes		Yes.
240	No	No	Fair	Yes		No.
241	Yes	No	Poor	Yes		No.
242	No	No	Fair	Yes	Yes	Yes.
243	No	No	Fair	Yes		No.
244	Yes	No	Fair	Yes		No.
245	No	No	Fair	Yes	No	Yes.
246	No	No	Good	Yes	Yes	Yes.
247	No	No	Good	Yes	Yes	Yes.
248	No	No	Fair	No		
249	No	No	Good	No		
250	No	No	Good	Yes		No.
251	Yes	No	Good	Yes		No.
252	Yes	No	Good	Yes	Yes	Yes.
253	Yes	No	Good	Yes		Yes.
254	No	No	Fair	Yes		No.
255	Yes	No	Good	Yes	Yes	Yes.
256	Yes	No	Fair	Yes		No.
257	No	No	Fair	Yes		No.
258	No	No	Good	Yes		Yes.
259	Yes	No	Good	Yes		Yes.
260	No	No	Fair	No		
261	No	No	Good	Yes		No.
262	Yes	No	Good	Yes		No.
263	Yes	No	Good	Yes		No.
264			Good	Yes	Yes	Yes.
265	No	No	Poor	Yes	Yes	No.
266	No	No	Good	Yes	Yes	Yes.
267	No	No	Fair	Yes	Yes	No.

TABLE No.

Establishment number.	STAIRWAYS.			ELEVATORS.		Are belt shifters used.
	Number inside.	Number outside.	Hand rails provided.	Number.	Openings protected.	
268	None	None		None		Yes
269	Yes	None	(N)	None		Yes
270	1	None	Yes	1	Yes	Yes
271	None	None		None		
272	None	None		None		Yes
273	None	None		None		Yes
274	None	None		None		Yes
275	1	None	No	None		Yes
276	None	None		None		
277	1	None	Yes	None		Yes
278	8	4	Yes	5	Yes	Yes
279	1	None	Yes	None		Yes
280	None			12	Yes	Yes
281	None	None		None		Yes
282	2	None		1	Yes	Yes
283	3	None	Yes	None		Yes
284	3	None	Yes	1	Yes	Yes
285	1	None	Yes	None		
286	None	None		None		Yes
287	(n)			4	No	Yes
288	2	None	Yes	None		Yes
289	None	None		None		Yes
290	8		No	4	Yes	Yes
291	2	None	Yes	None		Yes
292	2	None	Yes	None		Yes
293	None	None		None		Yes
294	3	None	Yes	1	Yes	Yes
295	2	None	Yes	None		Yes
296	1	None	Yes	None		Yes
297	None	None		None		Yes
298	1	1		None		Yes
299	6	None	Yes	2	Yes	Yes
300	None	None		None		Yes
301	None	None		None		Yes
302	6	None		1	Yes	Yes
303	2	None	Yes	None		Yes
304	1	None	Yes	None		Yes
305	1	None	Yes	1	No	Yes
306	None	None		None		Yes
307	2	None		1	No	Yes
308	None	None		None		Yes
309	2	None		1	Yes	Yes
310	1	None	Yes	1	Yes	Yes
311	2	None	Yes	1	Yes	Yes
312	1	None	Yes	None		Yes
313	None	None		None		Yes
314	None	None		None		Yes
315	1	None		1	Yes	Yes
316	(s)	None		None		Yes
317	None	None		None		Yes
318	(n)	None		None		Yes
319	1	None	Yes	1	Yes	Yes
320	1	None	Yes	1	Yes	Yes
321	None	None		None		Yes
322	None	None		None		Yes
323	1	None	Yes	1	Yes	Yes
324	None	None		None		Yes
325	3	None	Yes	1	Yes	Yes
326	3	None	Yes	1	Yes	Yes
327	1	None	Yes	1	Yes	Yes
328	1	None	Yes	1	Yes	Yes

-CONTINUED.

Establishment number.	Are saws, gearing, wheels, etc., guarded?	Are dust blowers provided?	Ventilation of factory.	Are water closets provided?	Are separate water closets provided for females?	Are closets cleanly?
268	No.	No.	Fair	Yes		Yes.
269	Yes	No.	Fair	Yes		Yes.
270	Yes	No.	Fair	Yes		No.
271			Good	Yes		Yes.
272	Yes	No.	Good	No		
273	Yes	No.	Good	Yes	No.	Yes.
274	No	No.	Fair	No.		
275	No.	No.	Fair	Yes		Yes.
276			Fair			
277	No.	No.	Good	Yes	No.	Yes.
278	Yes	No.	Fair	Yes		No.
279	Yes	No.	Good	Yes	Yes	No.
280	Yes	No.	Good	Yes		Yes.
281	Yes	No.	Good	Yes		Yes.
282	Yes	No.	Fair	Yes		No.
283	Yes	No.	Good	Yes	Yes	Yes.
284	Yes	No.	Good	Yes	Yes	Yes.
285			Good	Yes		Yes.
286	Yes	No.	Fair	Yes		No.
287	No	No.	Good	Yes		No.
288	Yes	No.	Good	Yes	Yes	No.
289	Yes	No.	Fair	Yes		No.
290	Yes (s)	No.	Fair	Yes		No.
291	Yes	No.	Good	Yes	No	Yes.
292	Yes	No.	Good	Yes	Yes	Yes
293	Yes	No.	Fair	Yes		Yes.
294	Yes	No.	Fair	Yes	No	Yes.
295	Yes	No.	Fair	Yes		Yes.
296	Yes	No.	Good	Yes		Yes.
297	Yes	No.	Good	Yes		Yes.
298	Yes	No.	Good	Yes	Yes	Yes.
299	No	No.	Good	Yes		Yes.
300	Yes	No.	Good	No (n)		
301	Yes	No.	Fair	Yes		Yes
302	Yes	No.	Good	Yes	Yes	Yes.
303	Yes	No.	Good	Yes	Yes	Yes.
304	Yes	No.	Good	Yes	No	Yes.
305	Yes	No.	Good	No		(O).
306	Yes (s)	No.	Fair	No		(O).
307	Yes	No.	Fair	No		(O).
308	Yes	No.	Fair	No		
309	No	No.	Good	Yes		No.
310	Yes	No.	Fair	No		(O).
311	Yes	No.	Fair	Yes		Yes.
312	Yes	No.	Good	Yes		Yes.
313	Yes	No.	Good	Yes		Yes.
314	Yes	No.	Good	Yes		Yes.
315	Yes	No.	Good	No		No.
316	Yes	No.	Good	Yes		No.
317	Yes	No.	Fair			
318	Yes	No.	Good	No		
319	Yes	No.	Good	N (w)		
320	Yes	No	Good	Yes		Yes.
321	Yes	No	Good			
322	Yes	No	Good	Yes		Yes.
323	No (s)	No.	Good	Yes		Yes.
324	Yes	No	Good	Yes		Yes.
325	Yes	No	Good	Yes		Yes (x).
326	Yes	No	Good	Yes		Yes.
327	Yes	No	Good	Yes		Yes.
328	Yes	No	Good	Yes		Yes.

REMARKS AND RECOMMENDATIONS.

1. (a) Outside fire escape and gate to open out.
2. (m) None.
3. None.
4. Guard near ironing machine
5. More room provided for passing of operators.
6. (r) None.
7. Requested water closet for employes.
8. Requested removal of set screws and guard near engine.
9. None.
10. Guards for elevators and decent closets.
11. None.
12. None.
13. Asked for clean closets.
14. Guards for elevators.
15. None.
16. None.
17. None.
18. None.
19. None.
20. Decent and cleanly closets.
21. None.
22. Fire escapes.
23. Fans for ventilators.
24. Fire escapes.
25. Fire escapes. Clean closets.
26. Fire escapes. Clean closets. Elevator guards.
27. None.
28. Water closets at once.
29. Clean water closets.
30. None.
31. Guard for outside elevator.
32. None.
33. Decent water closets.
34. Fire escape.
35. Better ventilation.
36. Removal of dangerous set screws. Belt boxed.
37. Decent water closets. Belts boxed.
38. None.
39. Belt covered and closets kept clean.
40. Belt covered. Decent water closets.
41. As modern closets are being built, no recommendation.
42. None.
43. None.
44. None.
45. Separate water closets for females.
46. Fire escapes.
47. Decent water closets.
48. Water closets to be ventilated.
49. Water closets to be ventilated.
50. Clean closets. Boxing for large fly wheel.
51. Closets cleaned daily. Automatic elevator gates.

52. Clean closets. Fly wheel guarded. Elevator guards.
53. Elevator guards. Decent closets.
54. Fire escapes. Railing near fly wheel. Water closets ventilated.
55. Water closets. Guard for fly wheel.
56. None.
57. Decent closet arrangements.
58. Fire escapes. Ventilation of closet and engine room. Exit for engine room.
59. Fire escapes or fire ladders.
60. None.
61. Fire escapes.
62. Clean closets.
63. Clean closets.
64. Clean closets with better access to same.
65. Drive belt properly guarded.
66. Decent water closets.
67. Enclosure for belt and dynamo. Decent water closets.
68. Regular cleaning of water closet.
69. Fire escapes should be erected.
70. Guard placed around engine.
71. None.
72. Belts guarded. Removal of set screws.
73. Guard for fly wheels and decent water closets.
74. Decent closets. Stair guard and bar shipping door cog-wheel guard.
75. Fire escapes. Belts and shafts to be guarded.
76. Foot guard main engine. Hand rail generator.
77. None.
78. None.
79. None.
80. Better boxing of drive belts.
81. Better care of water closets and urinals.
82. None.
83. Clean closets, correcting stereotyping fixture.
84. (w) Guard for fly wheel. Decent water closet.
85. Guard for belts every where. Clean closets.
86. None.
87. Removal set screw at rattler and guard at engine.
88. Guard for pending machines.
89. Guard for engine. Clean closets.
90. Clean water closet. Guard for shears and punch.
91. Separate water closet. Fire escapes.
92. Ventilation for closets.
93. Fire escapes.
94. None.
95. Guard for shipping door.
96. Cover on closet, closet locked and kept clean.
97. Clean closets.
98. Keeping closets decent and removal set screws.
99. Better water closets. Guard for elevator.
100. Regular boiler inspection. Boxed belts. Water closets.
101. Water closets.
102. Guards for belts every where and for large clutch.
103. Guards for belt and shafting. Decent closets.
104. Guards for shafts and clean closets.
105. Water closet.
106. Decent water closets. Guards needed every where.
107. Water closet. Belt boxed. Elevator guards. Removal of set screws.
108. Water closet, belt and shafting guarded.
109. Water closets should be provided.
110. Water closet and removal of set screws.
111. Clean and separate closets.
112. Clean and separate closets.
113. Clean closet. Wheel guarded.
114. Guarding belts and set screws.

117. Guard for fly wheel. Closet screened and locked.
118. Not operated. No recommendation.
119. Clean water closets.
120. Water closets clean and door provided.
121. None.
122. Clean water closets.
123. Clean closets
124. All dangerous machinery be guarded.
125. None.
126. Guard for all belts. Closet fixed and kept clean.
127. Separate water closets. Fire escapes.
128. None.
129. Clean closets.
130. Clean water closets.
131. Fire escapes.
132. Demanded fire escapes.
133. Fire escapes. Clean closets. Fly-wheel guard.
134. Clean closet.
135. Lock and keep closets clean.
136. Rattler guarded. Clean and disinfected closets.
137. Guard for fly-wheel in basement.
138. Clean closets.
139. Guard for engine. Clean closets.
140. None.
141. Ladder for fire escape.
142. Fire escapes. Clean closets.
143. None.
144. New floor. Water closet. Guard cone pulleys.
145. Clean closet.
146. Better water closet.
147. Clean closets. Band saw uncovered. Set-screw removed
148. Guard for fly-wheel
149. None.
150. None.
151. Guard at dry kiln.
152. Clean and disinfect closet
153. Clean closets.
154. Fire escapes.
155. Guard for fly-wheel.
156. Fire escape.
157. None.
158. Guard for cog-wheel.
159. Removal of set-screws.
160. None.
161. Clean closets.
162. Set screws removed.
163. None.
164. None.
165. Guard for cogwheel.
166. None.
167. None.
168. Belts and set screws removed.
169. None.
170. Set screws removed.
171. None.
172. None.
173. Clean closets. Machinery guarded.
174. Removal of set screws.
175. That workmen have more room.
177. Clean closet. Lathe covered.
178. Governor wheel protected.
179. None.
180. None.

181. (n).
182. Elevator guards and clean closet.
184. Clean closet.
185. Clean closets.
186. Clean closets. Removal set screws.
187. None.
188. Remove set screws. Clean closet.
189. None.
190. None.
191. None.
192. Clean closet. Fire escape.
193. Clean closets. Set screws guarded.
194. Wheels and elevator guarded.
195. None.
196. Clean closets.
197. None.
198. Covershaft from engine. Remove set screws. Clean closets
199. Removal of set screws
200. None.
202. Clean closets.
203. None.
204. Clean closets. Removal of set screws.
205. Clean up generally.
206. None.
207. None.
208. Keep closets locked.
209. Clean closets. Belts covered. Set screws removed.
210. Separate or locked closets, clean closets.
211. General cleaning up.
212. Clean closets.
213. None.
214. Clean closets. Remove set screws.
215. Clean closets. Removal set screws.
216. None.
217. Clean closets. Better condition machinery.
218. Clean closets. Machinery guarded.
219. Removal of dangerous set screws.
220. Removal of set screws.
221. Removal of set screws.
222. None.
223. None.
224. None.
225. Water closets. Guard for set screws.
226. Water closet. Belts guarded.
227. Remove set screws. Fix water closets.
228. Box drive belt.
229. Closet clean. Guard for belt.
230. Clean closets.
231. None.
232. None.
233. Clean closets.
234. Removal of set screws.
235. Water closets. Belts guarded.
236. Removal of set screws.
237. Removal of set screws.
238. Removal of set screws.
239. Remove set screws. Box belts.
240. Removal of set screws.
241. Better water closets.
242. Removal of set-screws.
243. Clean closets Belts covered.
244. Clean closets.
245. Removal of set-screws.

246. Removal of set-screws. Belts boxed.
247. Removal of set-screws.
248. Removal of set-screws.
249. Removal of set-screws.
250. Removal of set-screws. Clean closets.
251. Clean closets.
252. None. Good.
253. None.
254. Clean closets. Engine guard.
255. None.
256. Clean closets.
257. Decent water closets. Belts and screws covered.
258. Remove set-screw. Cover cog-wheel.
259. None.
260. Clean closets. Removal of set-screw.
261. Clean closet. Removal of screws.
262. Enclose closet, too exposed.
263. Lock for water closet.
264. None.
265. Removal of set-screws. Box belts. Clean closets.
266. Belts covered. Set-screws removed.
267. Guard belts. remove set-screw. Clean closets.
268. Guard for fly-wheels.
270. Clean closets.
271. None.
272. Provide clean closets.
273. Closet to be kept locked.
274. Belt covered.
275. Belt and set-screws covered. Provide stair rail.
277. Fly-wheel and pulleys covered.
278. Clean closets.
279. Clean closets.
280. None.
281. Model institution.
282. Clean closets.
283. None.
284. None.
285. None.
286. Furnish clean closets.
287. Guard pulleys. Clean closets.
288. Decent water closets.
289. Decent water closets.
290. Stair railing. Clean closets.
291. Boiler inspection.
292. Model plant.
293. Guard around fly wheel and motor.
294. Order and cleanliness.
295. None.
296. None.
297. None. See (r) citation.
298. None. Ideal factory.
299. Guards on striker machine.
300. None.
301. None.
302. None.
303. None.
304. Exits and fire escapes from upper floors.
305. None.
306. Water closets be kept clean.
307. General cleaning up.
309. Cleaner closets. Set screws removed.
310. None.
311. Must have fire escap.

- 312. None.
- 313. None.
- 314. Keep machinery clean.
- 315. None.
- 316. None.
- 317. None.
- 318. None.
- 319. None.
- 320. None.
- 321. None.
- 322. None.
- 323. None.
- 324. None.
- 325. Enclose water closet.
- 326. None.
- 327. None.
- 328. None.

FOOT NOTES.

1. (a) A very objectionable gate, opening in; is very dangerous.
2. (m) A model factory.
3. (n) Not given.
4. (v) 175 ft. air shaft. (h) Hand crushed.
5. (n) No reports. (o) Only fair. (f) Fair.
6. (s) Removal of factory to new building
7. (d) Dangerous. (g) Found twenty-five children. (o) During season.
9. (f) Ventilation by fan. (s) Stair for fire escape.
10. (c) No water closets provided. (l) Outside ladders.
12. (i) Power rented from nearby factory. (u) Six to twelve as needed.
14. (n) None reported, but ten children were found.
15. (r) Report says none, but two were under fourteen.
19. (c) Found twenty children under fourteen.
20. (c) Found twenty children under fourteen.
21. (s) Not reported. (n) Not in operation.
22. Gasoline engine used exclusively.
23. (c) Found six under fourteen.
24. (c) Found three under fourteen. (w) Water for elevator.
26. (m) Electric power. (c) Found fifteen under fourteen. (f) Finger hurt.
27. (b) Found fifteen under fourteen years.
30. (c) Found ten under fourteen.
31. † Outside of building and dangerous. (c) Found five children under fourteen.
32. (c) Found five under fourteen years.
33. (w) Water closets unfit for use. (c) Found three under fourteen.
34. (c) City inspection.
36. (c) Found twenty-five children under fourteen years. (n) Men should have better water closets.
38. (c) Found four children under fourteen years.
47. (e) Employes not given. (r) Railroad boiler maker.
48. (c) Found three under fourteen years. (e) Requested use of elevator guards.
49. (p) Piece work.
50. (s) Two stairs in every building. (c) Found thirty under fourteen years.
51. (c) Found forty under fourteen years.
52. (c) Found four under fourteen years.
53. (c) Found four children under fourteen years.
54. (c) Found six under fourteen years.
55. (h) Man hurt in eye.
56. (l) Leased power.
58. (v) Ventilation basement abominable.
62. (s) Gate in stair dangerous. (Have information of its removal.)

- 63. (c) Had a boy under fourteen years for guide.
- 67. (f) Outside stair in lieu of fire escape
- 68. (c) Found two under fourteen years.
- 69. (e) Hand lift. (c) Found two under fourteen years.
- 70. (f) Found outside stairway
- 72. (c) Found two boys under fourteen years.
- 76. (l) Lease power from Electric Light company.
- 77. (c) Found five under fourteen years.
- 79. (n) Not reported.
- 81. (x) Neighboring closet used.
- 83. (c) Found twenty-five under fourteen years.
- 86. (w) Water closet filthy. (c) Boys under 14.
- 88. (c) Found six under fourteen years.
- 89. (c) Found eight boys under fourteen years.
- 90. (x) Neighboring closet used. (s) Fourty pounds steam on twelve horse-power engine.
- 92. (c) Found nine under fourteen years.
- 93. (w) Only one closet for twenty-three males and forty females. (c) Found four under fourteen.
- 94. (c) Found four girls under fourteen years.
- 95. (c) Closet kept locked.
- 97. (c) Found two boys under fourteen years.
- 99. (p) Very unsatisfactory. (s) Number not given.
- 100. (c) Complaint made, but found none. (k) Man and boy.
- 101. (c) Found two under fourteen years.
- 109. (f) Ladders in lieu of fire escapes.
- 112. (c) Found two boys under fourteen years.
- 117. (h) Hand crushed in mangle.
- 118. (e) Each building.
- 121. (i) City inspector.
- 122. (a) Arm broken. (i) City inspector.
- 124. (j) City inspector.
- 127. (c) Found ten under fourteen years.
- 128. (c) Found twenty under fourteen years.
- 129. (b) Bridges from building to building. (h) Serious accident, 1899.
- 132. (c) Found twelve under fourteen years.
- 134. (w) Two closets, one clean; one filthy.
- 135. (f) Outside stairs.
- 136. (f) Freight elevator only.
- 139. (s) Sheds. (a) In case of accident all bills paid by employer.
- 140. (h) Loss of finger.
- 149. (i) Own inspection
- 151. (f) Third story opens on sidewalk one side.
- 152. (w) Work elevator.
- 157. (s) Number not given.
- 159. (f) In rear. (e) Two only guarded.
- 165. (f) Freight elevator.
- 166. (f) Freight elevator.
- 170. (n) Own engineers.
- 171. (h) Hand elevator.
- 174. (h) Hand elevator.
- 176. (s) Not stated.
- 181. Not in operation. Canning season closed.
- 186. (s) Second story.
- 187. (s) Stairs, too many to be enumerated.
- 189. (o) When in operation, not yet started.
- 196. (f) Steep hill on one side of building.
- 197. (i) Own inspection.
- 199. (h) Hand elevator.
- 202. (p) Piece work.
- 203. (f) Freight elevator.
- 214. (f) Fire escapes only partially.
- 219. (c) Found three boys under fourteen years.
- 220. (c) Found one boy under fourteen years.

- 224. (g) New closet being built.
- 227. (c) Found one boy under 14 years. (e) Traction engine.
- 234. (h) Hand elevator.
- 242. (c) Found sixty children under fourteen years.
- 245. (d) Not given (e) not given.
- 246. (a) Finger cut off.
- 250. (f) Freight elevator.
- 251. (f) Freight elevator.
- 252. (f) Freight elevator.
- 254. (a) Boiler inspection not stated.
- 261. (f) Freight elevator.
- 263. (s) Second floor.
- 264. (h) Loss of fingers.
- 265. (a) Found fifty under fourteen years of age.
- 267. (k) Boy's arm broken.
- 268. (n) Number of employes not stated.
- 269. (m) Number of stairs not given.
- 274. (n) Number of stories not given.
- 278. (h) Cuts and bruises.
- 280. (m) Not reported. (h) Cuts and bruises.
- 281. (m) No list, several cuts, sprains and bruises.
- 284. (h) Several cuts and bruises.
- 286. (i) Sprains and falls.
- 287. (h) Cuts, bruises and falls. (n) Not reported
- 290. (c) Except stair railing.
- 291. (i) No inspection of boiler.
- 292. (g) Fine of 10c for cleaning while running.
- 294. (h) Cuts and bruises.
- 297. (r) Refer to co-operative chapter.
- 299. (h) Cuts and bruises.
- 300. (m) Neighboring closet. (i) Inspected annually, cleaning monthly
- 305. (c) Outdoor closets only.
- 306. (c) Outdoor closet only. (d) Only hand tools used.
- 307. (c) Outdoor closet only.
- 308. (m) Not in active operation. Number not reported.
- 309. (h) Cuts and bruises.
- 310. Outdoor closets only.
- 311. (f) Lack of fire escapes serious; operatives top floor.
- 313. (m) Not reported. Cuts and bruises.
- 314. (h) No report. Cuts and bruises.
- 315. (m) No record cuts and bruises.
- 316. (s) Several stairs. No report.
- 317. (h) Number falls and bruises.
- 318. (m) Not reported.
- 319. (m) Neighboring closet.
- 320. (i) Leased steam.
- 321. (h) Burns and cuts.
- 322. (h) Cuts and bruises.
- 323. (s) Men run several machines endangering life.
- 324. (h) Cut and sprained.
- 325. (i) Outdoor to exposed. (h) Cut, burns and sprains.

FACTORY INSPECTION.

In order that the factory inspection may be clearly understood, a general table is given, together with a narrative covering the same establishments, each serving its special pur-

pose. For example, matters occur where a table to contain all necessary information would require double the size of table; hence both the tables and the running narrative are used. Both have the same marginal or serial numbers and are easily identified.

FACTORY INSPECTION—NARRATIVE.

1. *Noteworthy feature.* Reading room connected with factory. Magazines and periodicals for use of employes free. Open evenings. A gate in main exit should either open out or be removed. Three stories. No fire-escapes. One hundred and forty-eight employes.
2. A model institution.
3. The best of its kind.
4. Guards near machines to prevent repetition of accidents recommended. A ventilating shaft or stack 175 feet high furnishes pure air for thirty-five employes of this laundry.
5. Everything too crowded for safety.
6. New factory—a model.
7. No water-closet. Thirteen employes.
8. Very primitive fire-escapes. Two hundred and seventy-five employes. Clutches provided for detaching every machine in building. Three set-screws endangering life. Engine and fly-wheel too much exposed.
9. Commendable in every way.
10. No elevator-guards. Very filthy water-closets.
11. No recommendations.
12. No recommendations.
13. Very filthy water-closets.
14. No elevator-guards. One hundred and forty employes.
15. No recommendations.
16. Gates locked during working hours. Thirty males, twenty females employed. Each employe should have keys for the gates in case of fire.
17. No recommendations.
18. No recommendations.
19. One hundred male, 200 females. Employes safety provided for as much as possible.
20. A cluttered up appearance; apparent indifference as to employes safety. One hundred male, one hundred female employes.
21. Not in operation. No actual inspection.
22. Fire-escapes needed. Forty-five male, fifty-five female employes. Three story building.
23. Recommended dust-blowers and ventilating fans for shops. One hundred and twenty-three employes.
24. Twelve male, eighteen female employes. Three story and basement building. No fire-escapes.
25. Elevators unguarded. No fire-escapes. Three story building. Forty-four employes. Objectionable and filthy water-closet, and discourteous proprietors.
26. Elevator unguarded. No fire-escapes. Three story building. Forty employes.
27. No recommendations.

28. Three hundred and fifty employes and utterly inadequate water-closets.
29. Water-closets very filthy.
30. No recommendations. Model factory.
31. Apparent disregard for safety of 125 employes. No elevator guard and refusal to provide same.
32. No recommendations.
33. Insufficient and unclean water-closets.
34. Fifty employes. Four story building. No fire-escapes.
35. Laundry. Scarcely any ventilation.
36. Two hundred and twenty-five males, one hundred and twenty-five females. Water-closets for males very bad. Two dangerous set-screws. Large driving belt unboxed.
37. Better water-closets recommended, also enclosing of driving belt.
38. No recommendations.
39. Poor sanitary arrangements. Driving belt uncovered.
40. Water-closets unfit for use. Driving belt unboxed.
41. Neglect of elevator gates habitual. Bad water closets, but new ones promised.
42. No recommendations.
43. No recommendations.
44. No recommendations.
45. Forty males, seven females. Only one water-closet.
46. Forty males, forty females. Three story building. No fire escapes.
47. Large number employes. Inadequate water-closets.
48. Unventilated water-closets.
49. Unventilated water-closets.
50. Two hundred and fifty employes. Inadequate water-closets. Belt on big drive wheel uncovered.
51. Seven hundred males, fifty females. Automatic gates needed on eight elevators. Water-closets should be cleaned daily.
52. Elevator opening unguarded. Fly wheel unguarded. Poor water-closets.
53. Twenty operatives insured against accident to the amount of \$10,000 at employers expense, covering all the employes. Three stories. No elevator guards. Insufficient water-closets.
54. Fly wheel in engine room unguarded. No ventilation of water-closets.
55. Fly wheel in engine room unguarded. Filthy water-closets.
56. No recommendations.
57. Indescribable filthy water-closets.
58. Engine room a death trap. No reasonable exit nor ventilation. Water-closet very offensive.
59. Lack of fire escapes or fire ladders.
60. No recommendations.
61. A model laundry.
62. A locked gate in turn of stairway endangering fifty-eight males and eighty females in three story building. Without fire escapes. (Information at hand that location of gate has been changed; bettering the situation somewhat.)

63. Three story and basement. No fire escapes. Sixteen employes. Unclean water-closets.
64. Unsatisfactory water-closets.
65. Access to water-closet almost impossible, through defective drainage.
66. Drive-belt exposed, endangering life.
67. No recommendations.
68. No proper seat at water-closet. Very filthy.
69. Exposed belts and dynamos. Unsatisfactory water-closets.
70. Water-closets very filthy.
71. Absence of fire-escapes or ladders. Eleven employes. A two-story mill.
72. Engine entirely unguarded.
73. No recommendations.
74. Twenty-five males, forty females. Four stories. No fire-escapes. A lot of machinery close together, endangering life and limb of operatives.
75. Flywheel unguarded. Water-closets filthy.
76. Unsatisfactory water-closets.
77. Sixty males. Six stories. No fire-escapes. Belts and shafts unguarded everywhere.
78. Footguard at main engine needed, and guard for electrical generator.
79. No recommendations.
80. No recommendations.
81. No recommendations.
82. Drive-belts unboxed.
83. Several hundred male employes. Neglected water-closets and defective urinals.
84. No recommendations.
85. Stereotyping boiler objectionable. Filthy water-closet. (Subsequent investigation shows that proper remedies have been applied.)
86. Flywheel unguarded. One of the filthiest water-closets in the state. Twenty male employes.
87. All machinery unguarded. Water-closets very objectionable.
88. No recommendations.
89. Number of dangerous set-screws, and machinery in operation near narrow passageway.
90. Unguarded dangerous machinery.
91. Engine unguarded. Water-closets shockingly primitive.
92. Dangerous machinery unguarded. Very unsatisfactory water-closets.
93. Twenty-three males, forty females at time of inspection. Only one water-closet in use at that time. Most flagrant disregard of the decencies disclosed by the inspection. Subsequent inspection shows second closet put in use, though it is not evident that the different sexes are debarred from using them indiscriminately.
94. Water-closet has no ventilation.
95. Ten male, five female employes. Only one water-closet. No fire-escapes. Three stories.
96. No recommendations.
97. Slat door for water-closet needed for ventilation.
98. Water-closet defective.

99. Water-closets offensive. Twenty male, ninety female employes. Useless makeshifts as fire-escapes.

100. One hundred and seventy-five male, fifty female employes. Four stories. No fire-escapes. One man and boy killed by set screws on shafting during year preceding inspection. Apparent disregard of welfare of employes. Offensive closets. Ventilation bad throughout.

101. Absence of elevator guards. Filthy water-closet.

102. No water-closet for self or tenants. Five people employed. Belts unboxed.

103. Tenants of No. 102. Five people employed. No water-closet.

104. A very dangerous clutch exposed. Belts unboxed in numerous places.

105. Unguarded belts and shafting everywhere. Abominable water-closets.

106. Unguarded belts and shafting generally, with bad water-closet.

107. No water-closet. Seven male, sixteen female employes.

108. Unsatisfactory water-closet.

109. Absence of elevator guards. Absence of fire-escapes. Three stories. Eighteen male employes. Belts and set screws exposed, endangering operators. Disgraceful water-closets.

110. Unguarded belts and shafting. Unsatisfactory water-closets.

111. Neglected water-closets.

112. Many dangerous set screws. Absence of water-closet.

113. Five male, three female employes. Only one closet.

114. Large fly-wheel unguarded. Males and females employed. Only one water-closet.

115. Large wheel unguarded.

116. Belts and set-screws exposed in numerous places.

117. Fly-wheel unguarded. Six males, sixteen females employed. Only one water-closet, and it unscreened and unlocked.

118. Not in actual operation.

119. Very poor water-closets for R. R. shops.

120. Large water-closets without doors, exposed to inclemencies of the weather.

121. No recommendations. A fine plant.

122. Water-closets very bad.

123. Water-closets very filthy.

124. A great deal of dangerous machinery unguarded.

125. Very satisfactory conditions.

126. Unsatisfactory water-closets. All belts unguarded.

127. Four stories. Ten males, 140 females. No fire-escapes. Only one water-closet in establishment.

128. Fourteen males, 150 females. Five stories. Only means of escape in case of fire, an outside stairway.

129. Engine unguarded and water-closets unsatisfactory, no care given them.

130. Water-closets in uncleanly condition.

131. Two stories. Forty-six employes. No fire-escapes.

132. Thirty males, thirty females. Four stories. No fire-escapes.

133. Twelve employes. Three stories. No fire-escapes. Fly-wheel unguarded.

134. Two closets in establishment. Fifty-five employes. Three stories. No fire-escapes. One of closets very clean, while the other very filthy, showing that some people are cleanly, while others are filthy.

135. Closet unlocked and unclean.

136. Dangerous machinery. (Rattler) unguarded. Closets for 110 employes needs disinfection. Inspector informed by proprietor that he had not seen this closet for a year and did not know its condition.

137. Fly-wheel in basement unguarded.

138. Closets ventilated, but not clean.

139. Moving into new model factory. When an accident occurs among the 150 employes, the injured is taken to hospital or home as he elects, all expenses paid by employers. Salaries or wages paid in full, until complete recovery. (Law does not permit naming of establishment.)

140. No recommendations.

141. Thirty-four employes. Five stories. No fire escape.

142. Fifty employes. Five stories. No fire escapes. Bad water closets.

143. No recommendations.

144. Floor in water closet reeking with filth. Twenty employes. Cone pulleys unguarded.

145. Closets for 200 employes very unsatisfactory.

146. Forty employes. Bad water closets.

147. Fifty employes. Very bad water closets.

148. Engine fly wheel dangerously exposed.

149. No recommendations.

150. No recommendations.

151. Guard needed at dry kiln in soap factory.

152. Closet filthy.

153. Closets unclean.

154. Thirty-four employes. Four stories. No fire escapes.

155. Numerous cogwheels unguarded in bakery.

156. Lack of fire escapes. Six employes. Two stories.

157. One of the elevator openings absolutely unguarded,

158. Dangerous cog wheel unguarded in bakery.

159. One of three elevators unguarded. Three very dangerous set screws.

160. No recommendations.

161. Abominable water closets.

162. Number of dangerous set screws.

163. No recommendations.

164. No recommendations.

165. Dangerous cog wheels uncovered.

166. Three hundred and fifty employes Library, bath rooms and gymnasium provided for employes free of charge. A man to obtain employment must become a member of an accident association, conducted by the men and sustained by them, under the supervision of the employers.

167. No recommendations.

168. Belts and set screws exposed everywhere.

169. No recommendations.
170. Number of dangerous set screws. Railroad shops. Their removal promised.
171. No recommendations.
172. No recommendations.
173. Much machinery unguarded. Fifty employes. Very bad water-closets. Number of employes refuse to use the conveniences provided on account of filth, delaying natural necessities, thereby endangering health, and unable to render satisfactory service. Secretary of State Board of Health, Dr. J. F. Kennedy, has favored this bureau with an opinion based on what inspector stated regarding this particular case. (Dr. Kennedy's letter appears elsewhere in this report.)
174. A great number of dangerous set-screws.
175. Seventy-five employes. Machinery crowded too close for safety and comfort.
176. No recommendations.
177. A dangerous lathe, and unclean closets.
178. Governor-wheel unprotected.
179. Thirty-two employes. Fourth story. No fire-escape. Claimed that large front stair is sufficient.
180. No recommendations.
181. No recommendations.
182. No elevator-guards, and dirty closets.
183. Belts unguarded, and number of dangerous set-screws.
184. Very bad closets.
185. Bad water closets.
186. Dangerous set-screws and filthy water-closets.
187. Three hundred and fifty employes. Much dangerous machinery. Manager evinced a disposition to lessen danger as much as possible.
188. Bad closets. Many dangerous set-screws.
189. No recommendations.
190. No recommendations.
191. No recommendations.
192. Three stories. Nineteen employes. No fire-escape. Filthy closets.
193. Number of set-screws. Filthy, unventilated closets.
194. Flywheel exposed. Elevator unguarded.
195. No recommendations.
196. Thirty males, twenty females. Both water-closets very filthy.
197. No recommendations.
198. Engine shaft dangerously exposed, also a number of set-screws.
199. Number of set screws are in evidence.
200. No recommendations.
201. No recommendations. One hundred and forty-two employes in three story building. Should have fire escapes provided.
202. Bad and insufficient closets for use of twenty-five employes.
203. No recommendations.
204. Bad closets and number of set screws.
205. A cleaning up generally. A filthy place.
206. No recommendations.
207. No recommendations.

- 208. Five males, seven females. Only one closet, and it unlocked.
- 209. Dirty closets. Dangerous drive belts, and set screws.
- 210. Four male, four female employees. Only one water-closet, and it very dirty.
- 211. Sixty males, twenty females. A filthy place. A disease breeding institution.
- 212. Filthy water-closets.
- 213. No recommendations.
- 214. Unsatisfactory water-closets for seventy males, and 115 females. Dangerous machinery unguarded throughout the establishment.
- 215. Bad water closets. Dangerous set screws.
- 216. No recommendations.
- 217. A great deal of dangerous machinery.
- 218. Water-closets bad. Considerable dangerous machinery.
- 219. Many dangerous set screws.
- 220. Number of dangerous set screws.
- 221. Too many set screws for safety of employees.
- 222. No recommendations.
- 223. No recommendations.
- 224. Awful water-closets. (They are building new ones.)
- 225. Bad closets. Many dangerous set screws.
- 226. Unguarded drive belts. Filthy closets, and no disposition to remedy same.
- 227. Dangerous set screws.
- 228. Drive belt a menace to employes.
- 229. Terrible water-closets. Belts unguarded.
- 230. Bad closets.
- 231. No recommendations.
- 232. No recommendations.
- 233. Poor water-closets.
- 234. Many dangerous set screws.
- 235. No closets. Belts unguarded.
- 236. Too many set screws.
- 237. A number of set screws.
- 238. Many dangerous set screws.
- 239. Number of set screws and belts, exposed.
- 240. Large number of set screws.
- 241. Poor water closets.
- 242. An appalling number of set screws.
- 243. Belts exposed; closets filthy.
- 244. Bad water closets.
- 245. Many set screws.
- 246. Belts and set screws exposed.
- 247. A lot of set screws a perpetual menace here.
- 248. Set screws unguarded.
- 249. Set screws.
- 250. Bad closets; many set screws. (No disposition to correct the evils complained of.)
- 251. Bad closets.
- 252. No recommendations; a fine plant: forty-eight employees.

253. No recommendations.
254. Engine unguarded; closets bad.
255. No recommendation.
256. Bad and insufficient closet for nineteen employes.
257. Bad water closets; belts and set screws exposed.
258. Cogwheels and set screws exposed; fifty employes.
259. No recommendations.
260. Bad set screws; no water closet; eighteen employes.
261. Bad water closets; sixty employes; number of set screws.
262. Water closet for 350 men absolutely exposed to the elements; unworthy of railroad shops; vigorous complaint by employes.
263. Three males and forty females; only one closet; lock for closet should be provided.
264. No recommendation.
265. Belts unboxed and dangerous; closets bad, especially when among 140 employes inspector finds about fifty under fourteen years of age.
266. Belts and set-screws exposed.
267. Bad closets. Belts and set-screws exposed.
268. Fly-wheel unguarded.
269. State institution.
270. Very filthy closets.
271. No recommendations.
272. Better sanitary arrangements.
273. Four males, four females. A laundry. Only one closet. Lock and key needed.
274. Drive-belt exposed.
275. Belts and set-screws, endangering fifteen employes.
276. No recommendations.
277. Fly-wheel and pulleys exposed.
278. Closets defective. Three hundred and sixty employes.
279. Bad closets for a newspaper.
280. No recommendations.
281. Model in every particular. Railroad shops.
282. No recommendations.
283. No recommendations.
284. No recommendations.
285. No recommendations.
286. Twelve employes. No water-closets.
287. Considerable machinery unguarded. Unclean closets. Twenty-two employes.
288. Bakery. Twenty-two employes. Defective water-closets.
289. One hundred men. Offensive water-closets.
290. Sixty-two employes. Three stories. Eight stairways. No rail-ings. Water-closets bad. Food products prepared here.
291. Thirteen employes. No boiler inspection.
292. Rule of a 10-cent fine for cleaning machinery while in motion, strictly enforced. Model button plant.
293. Fly-wheel and motor unguarded.
294. Disorder prevalent, endangering 248 employes. Employer doing the best possible under the circumstances.

- 295. No recommendations.
- 296. No recommendations.
- 297. A purely co-operative affair. Twelve men. (See co-operative.)
- 298. No recommendations. Ideal factory.
- 299. Some machinery unguarded.
- 300. No recommendations.
- 301. No recommendations.
- 302. No recommendations.
- 303. No recommendations.
- 304. Thirty-two employees. Three stories. Insufficient exits in case of fire.
- 305. No recommendations.
- 306. An aggravated case of neglected of water-closets.
- 307. Thirty-six employees. Too cluttered up for safety.
- 308. No recommendations.
- 309. A number of set screws.
- 310. No recommendations.
- 311. A model factory, except that fire-escapes should be provided for twenty-five employees working on fourth floor.
- 312. No recommendations.
- 313. Railroad shops. Water-closets unprotected from the elements.
- 314. No recommendations.
- 315. No recommendations.
- 316. No recommendations.
- 317. No recommendations.
- 318. No recommendations.
- 319. No recommendations.
- 320. No recommendations.
- 321. No water-closets provided. Eleven employees.
- 322. Employees required to operate more than one machine, which is not conducive to safety.
- 323. No recommendations.
- 324. Closet-out doors, too much exposed.
- 325. No recommendations.
- 326. Water-closets not satisfactory.
- 327. Water-closets not clean.
- 328. Railroad shops. Everything the best that can be had. Wood planing machine need guard for belt.

MANUFACTURING INDUSTRIES OF IOWA

MANUFACTURES IN IOWA BY

Running
number.

MANUFACTURING AND MECHANICAL INDUSTRIES.

Number of
establish-
ments.

1	ALL INDUSTRIES.....	14819
2	Agricultural implements.....	24
3	Awnings, tents and sails.....	22
4	Axle grease.....	3
5	Baking and yeast powders.....	4
6	Bicycle and tricycle repairing.....	130
7	Blacksmithing and wheelwrighting.....	2408
8	Bookbinding and blank book making.....	16
9	Boots and shoes, custom work and repairing.....	47
10	Boots and shoes, factory product.....	7
11	Bottling.....	10
12	Boxes, cigar.....	9
13	Boxes, fancy and paper.....	7
14	Boxes, wooden packing.....	10
15	Brass castings and brass finishing.....	3
16	Bread and other bakery products.....	194
17	Brick and tile.....	339
18	Bridges.....	13
19	Brooms and brushes.....	71
20	Buttons.....	53
21	Carpentering.....	740
22	Carpets, rag.....	75
23	Carriage and wagon materials.....	14
24	Carriages and wagons.....	211
25	Cars and general shop construction and repairs by steam railroad companies.....	58
26	Cars and general shop construction and repairs by street railroad companies.....	3
27	Cheese, butter and condensed milk, factory product.....	907
28	China decorating.....	3
29	Clothing, mens', custom work and repairing.....	506
30	Clothing, mens', factory product.....	18
31	Clothing, womens', dressmaking.....	291
32	Clothing, womens', factory product.....	7
33	Coffee and spice, roasting and grinding.....	12
34	Coffins, burial cases and undertakers' goods.....	5
35	Confectionery.....	64
36	Cooperage.....	71
37	Druggists' preparations, not including prescriptions.....	6
38	Dyeing and cleaning.....	31
39	Electrical construction and repairs.....	12
40	Fancy articles, not elsewhere specified.....	3
41	Flavoring extracts.....	4
42	Flouring and grist mill products.....	702
43	Food preparations.....	16
44	Foundry and machine shop products.....	190
45	Fruits and vegetables, canning and preserving.....	20
46	Fur goods.....	14
47	Furnishing goods, mens'.....	3
48	Furniture, cabinet-making, repairing and upholstering.....	103
49	Furniture, factory product.....	26
50	Furs, dressed.....	6
51	Gas, illuminating and heating.....	26
52	Gas machines and meters.....	6
53	Gloves and mittens.....	9

SPECIFIED INDUSTRIES—1900.

RUNNING NUMBER.	CAPITAL.					Proprietors and firm members.
	Total.	Land.	Buildings.	Machinery, tools, and implements.	Cash and sundries.	
1.....	\$ 102,733.103	\$ 11,701.330	\$ 18,554.185	\$ 26,150.011	\$ 46,327.577	16619
2.....	1,878,090	71,940	214,367	105,067	1,396,717	16
3.....	59,715	11,500	6,550	7,735	33,930	23
4.....	66,389	3,100	10,800	6,206	46,283	2
5.....	10,500	100	500	1,500	8,400	1
6.....	125,070	14,350	10,425	41,470	53,825	149
7.....	2,774,287	495,118	688,883	670,004	920,192	2745
8.....	39,700			20,295	19,405	19
9.....	195,886	31,745	50,664	53,643	59,834	492
10.....	506,757	12,100	57,840	86,47	350,346	7
11.....	22,097	200	350	10,960	10,587	13
12.....	56,953	1,650	4,000	9,167	42,136	7
13.....	31,644			16,667	14,977	8
14.....	378,550	35,737	48,927	71,924	221,962	15
15.....	367,310	20,000	30,000	99,610	217,700	4
16.....	1,301,962	142,914	227,300	549,936	381,752	217
17.....	3,076,355	574,097	1,036,217	727,441	738,600	441
18.....	127,520	25,000	13,400	26,120	63,000	17
19.....	161,577	17,316	34,465	19,140	90,656	83
20.....	324,315	15,685	24,991	111,727	171,912	61
21.....	1,172,124	130,608	144,597	224,879	672,040	925
22.....	50,355	11,305	13,975	17,567	7,508	83
23.....	144,551	16,900	41,800	23,175	62,676	14
24.....	4,087,400	338,147	451,661	504,239	2,793,353	270
25.....	3,277,617	232,825	1,365,929	816,126	862,737	.....
26.....	62,825	11,300	26,500	15,300	9,725	.....
27.....	3,459,017	145,198	1,095,429	1,499,183	719,207	565
28.....	1,425	25	200	175	1,025	3
29.....	727,034	69,746	89,160	76,263	491,865	581
30.....	660,514	10,000	30,000	74,545	545,969	8
31.....	120,200	16,915	34,770	20,724	41,791	337
32.....	23,899			4,300	19,599	11
33.....	403,313	9,100	30,610	46,497	317,106	15
34.....	314,286	19,700	51,070	21,576	221,940	3
35.....	577,197	34,590	65,535	186,762	290,310	70
36.....	326,434	31,080	59,745	60,186	175,423	80
37.....	44,710	2,000	8,200	4,110	30,400	5
38.....	56,080	10,250	19,500	17,175	9,155	39
39.....	40,485	250	800	5,965	33,470	11
40.....	1,940			40	1,900	3
41.....	6,050			750	5,300	4
42.....	6,421,078	762,946	1,481,670	2,379,941	1,796,521	866
43.....	2,501,521	164,100	702,500	840,071	794,850	21
44.....	3,732,774	310,487	569,516	1,027,782	1,824,989	216
45.....	1,027,321	37,900	190,900	311,869	486,652	15
46.....	52,955	2,500	5,000	3,955	41,500	17
47.....	25,162			2,741	22,421	1
48.....	170,742	20,575	34,700	22,433	93,034	124
49.....	1,021,658	86,010	161,180	176,002	598,466	11
50.....	15,250	325	2,025	8,100	3,900	8
51.....	4,129,984	241,338	258,452	3,325,820	304,374	.....
52.....	29,700	100	3,200	3,500	22,900	8
53.....	277,008	22,000	35,000	22,500	197,508	17

MANUFACTURES IN IOWA BY SPECIFIED

Running number.	MANUFACTURING AND MECHANICAL INDUSTRIES.	Number of establishments.
54	Grease and tallow.....	8
55	Hair work.....	7
56	Hardware.....	5
57	Ice, artificial.....	3
58	Iron work, architectural and ornamental.....	12
59	Jewelry.....	3
60	Kindling wood.....	3
61	Lime and cement.....	28
62	Liquors, malt.....	21
63	Liquors, vinous.....	6
64	Lock and gun smithing.....	41
65	Looking-glass and picture frames.....	35
66	Lumber and timber products.....	264
67	Lumber, planing mill products, including sash, doors and blinds.....	65
68	Marble and stone work.....	39
69	Masonry, brick and stone.....	170
70	Mattresses and spring beds.....	7
71	Millinery, custom work.....	926
72	Mineral and soda waters.....	73
73	Models and patterns.....	4
74	Monuments and tombstones.....	139
75	Musical instruments and materials, not specified.....	6
76	Oil, linseed.....	4
77	Painting, house, sign, etc.....	338
78	Paints.....	6
79	Paper and wood pulp.....	4
80	Paper hanging.....	28
81	Patent medicines and compounds.....	41
82	Paving and paving materials.....	38
83	Perfumery and cosmetics.....	6
84	Photography.....	406
85	Pickles, preserves and sauces.....	15
86	Plastering and stucco work.....	58
87	Plumbing and gas and steam fitting.....	196
88	Pottery terra cotta and fire clay products.....	17
89	Printing and publishing, book and job.....	115
90	Printing and publishing, newspapers and periodicals.....	910
91	Roofing and roofing materials.....	29
92	Rubber and elastic goods.....	3
93	Saddlery and harness.....	982
94	Sausage.....	4
95	Scales and balances.....	7
96	Sewing machine repairing.....	6
97	Ship and boat building, wooden.....	10
98	Shirts.....	5
99	Show cases.....	3
100	Slaughtering and meat packing, wholesale.....	20
101	Slaughtering, wholesale, not including meat packing.....	7
102	Soap and candles.....	12
103	Starch.....	4
104	Steam fittings and heating apparatus.....	4
105	Sugar and molasses, refining.....	33
106	Tinsmithing, coppersmithing and sheet-iron working.....	624
107	Tobacco, cigars and cigarettes.....	408
108	Tools, not elsewhere specified.....	4
109	Trunks and valises.....	7
110	Upholstering materials.....	7
111	Vinegar and cider.....	8
112	Washing machines and clothes wringers.....	3
113	Watch, clock and jewelry repairing.....	482
114	Windmills.....	8
115	Window shades.....	3
116	Wire-work, including wire rope and cable.....	25
117	Wood, turned and carved.....	13
118	Woolen goods.....	12
119	All other industries*	73

INDUSTRIES—1900—CONTINUED.

RUNNING NUMBER.	CAPITAL.					Proprietors and firm members.
	Total.	Land	Buildings.	Machinery, tools, and implements.	Cash and sundries.	
54	22,392	4,070	5,050	0,250	6,422	10
55	9,045	1,000	2,500	345	5,200	9
56	249,139	18,149	39,470	73,264	118,256	4
57	165,300	23,000	20,800	88,000	24,500	3
58	372,305	26,200	37,108	83,699	225,298	10
59	12,275	1,100	2,050	3,250	5,875	7
60	22,000	6,314	3,874	5,562	6,250	2
61	663,830	89,100	150,325	261,785	153,620	27
62	2,420,515	215,005	973,110	417,677	814,723	18
63	2,100	160	910	715	315	6
64	31,173	4,275	3,315	16,375	7,208	44
65	34,150	2,200	3,300	5,450	23,200	42
66	8,762,219	1,978,335	273,966	813,282	5,690,636	327
67	3,576,305	232,177	395,621	494,335	2,454,172	66
68	370,479	60,425	57,900	103,977	148,177	47
69	624,713	32,102	23,287	130,689	438,635	216
70	54,531	5,700	3,000	8,522	37,309	5
71	1,235,043	145,840	233,325	55,535	800,343	1127
72	368,447	63,155	57,645	132,470	145,177	83
73	11,720	1,600	3,070	5,040	1,950	6
74	637,587	53,475	67,275	35,942	480,895	183
75	15,125	.....	.....	5,950	9,175	8
76	647,029	85,000	57,000	192,000	313,029	.....
77	381,402	32,495	29,295	54,477	165,135	413
78	207,425	7,442	22,550	20,813	156,880	9
79	182,045	20,000	10,000	124,400	27,645	2
80	76,106	6,760	5,990	4,525	58,921	28
81	512,019	20,416	5,460	30,789	455,354	45
82	146,082	20,235	5,472	34,885	85,490	51
83	79,350	2,000	9,000	3,500	64,850	11
84	490,859	63,735	115,100	207,247	104,777	441
85	471,171	48,726	117,701	87,169	217,575	10
86	24,084	1,025	1,600	4,918	16,541	73
87	575,937	20,300	38,750	86,627	421,260	259
88	301,258	85,550	111,567	71,100	93,041	17
89	976,341	20,300	100,214	513,812	333,015	121
90	4,703,049	239,560	405,976	2,451,255	1,606,258	1083
91	92,071	12,825	10,250	12,735	56,261	34
92	2,436	.....	.....	684	1,752	2
93	2,977,146	294,838	496,398	216,350	1,969,560	1097
94	18,300	5,000	6,800	2,600	4,100	6
95	65,492	2,100	3,400	15,500	44,492	4
96	1,012	.....	.....	677	365	6
97	28,906	8,400	5,625	6,200	8,771	9
98	10,300	.....	.....	3,750	6,550	7
99	4,960	.....	.....	1,760	3,200	4
100	6,264,578	151,750	1,108,153	499,375	4,415,300	13
101	86,775	26,300	33,900	15,700	10,875	6
102	317,410	25,900	41,650	61,167	188,693	14
103	700,064	30,000	225,000	205,234	239,830	.....
104	84,317	4,500	9,000	23,000	47,817	5
105	107,582	12,050	29,130	23,230	43,172	40
106	1,459,276	191,977	312,378	308,884	676,037	783
107	1,264,077	52,160	67,437	65,020	1,079,474	458
108	154,395	5,000	17,600	24,300	107,495	4
109	30,340	6,000	1,650	3,190	19,500	7
110	61,505	1,900	9,228	22,260	28,017	2
111	126,957	14,905	37,670	40,788	33,594	4
112	19,500	1,000	1,300	5,200	12,000	5
113	531,603	69,416	101,811	158,278	202,074	492
114	161,104	16,800	12,689	13,843	117,772	7
115	3,150	500	500	250	1,900	2
116	186,510	6,840	16,525	76,937	86,198	34
117	48,000	3,680	6,860	14,475	22,985	21
118	494,074	24,990	67,850	143,350	257,884	11
119	11,509,227	2,866,907	2,991,102	3,074,213	2,577,005	78

MANUFACTURES IN IOWA BY SPECIFIED

Running number.	MANUFACTURING AND MECHANICAL INDUSTRIES.	Salaried officials, clerks, etc.	
		No.	Salaries.
1	ALL INDUSTRIES.....	5664	\$ 4,486,117
2	Agricultural implements.....	154	123,472
3	Awnings, tents and sails.....	5	6,169
4	Axle grease.....	17	15,534
5	Baking and yeast powders.....	8	4,038
6	Bicycle and tricycle repairing.....	2	1,070
7	Blacksmithing and wheelwrighting.....	6	2,230
8	Bookbinding and blank book making.....	17	14,380
9	Boots and shoes, custom work and repairing.....		
10	Boots and shoes, factory product.....	40	35,832
11	BotTLing.....	8	2,596
12	Boxes, cigar.....	4	4,180
13	Boxes, fancy and paper.....		
14	Boxes, wooden packing.....	15	14,240
15	Brass castings and brass finishing.....	18	12,010
16	Bread and other bakery products.....	171	112,344
17	Brick and tile.....	94	65,068
18	Bridges.....	2	2,200
19	Brooms and brushes.....	17	14,389
20	Buttons.....	42	26,306
21	Carpentering.....	39	16,967
22	Carpets, rag.....	3	2,550
23	Carriage and wagon materials.....	23	7,995
24	CarrIages and wagons.....	140	112,704
25	Cars and general shop construction and repairs by steam rail- road companies.....	278	249,948
26	Cars and general shop construction and repairs by street rail- road companies.....	6	8,400
27	Cheese, butter and condensed milk, factory product.....	413	81,425
28	China decorating.....		
29	Clothing, mens', custom work and repairing.....	33	25,464
30	Clothing, mens', factory product.....	138	101,818
31	Clothing, womens', dressmaking.....	3	2,145
32	Clothing, womens', factory product.....	10	3,520
33	Coffee and spice, roasting and grinding.....	64	59,474
34	Coffins, burial cases and undertakers' goods.....	27	27,238
35	Confectionery.....	111	91,612
36	Cooperage.....	12	8,457
37	Druggists' preparations, not including prescriptions.....	7	6,060
38	Dyeing and cleaning.....	12	6,216
39	Electrical construction and repairs.....	9	6,520
40	Fancy articles, not elsewhere specified.....		
41	Flavoring extracts.....	13	6,980
42	Flouring and grist mill products.....	210	160,476
43	Food preparations.....	54	49,510
44	Foundry and machine shop products.....	221	204,969
45	Fruits and vegetables, canning and preserving.....	46	27,305
46	Fur goods.....	2	930
47	Furnishing goods, mens'.....	10	7,020
48	Furniture, cabinet-making, repairing and upholstering.....	8	3,870
49	Furniture, factory product.....	105	84,676
50	Furs, dressed.....		
51	Gas illuminating and heating.....	90	70,120
52	Gas machines and meters.....	6	4,750
53	Gloves and mittens.....	43	31,198

INDUSTRIES—1900—CONTINUED.

RANKING NUMBER.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
	Total.		Men, 16 years and over.		Women, 16 years and over.		Children, Under 16 years.	
	Av. No.	Wages.	Av. No.	Wages.	Av. No.	Wages.	Av. No.	Wages.
1.....	58553	23,931,680	48417	21,893,983	8248	81,766,586	1888	8271,111
2.....	644	243,489	641	242,568	1	421	2	500
3.....	45	12,519	22	7,242	23	5,277	.....	.....
4.....	20	12,475	20	12,475	.....	.....	.....	.....
5.....	11	3,547	7	2,440	4	1,107	.....	.....
6.....	107	42,745	103	42,192	.....	.....	45	553
7.....	1177	503,236	1162	501,317	.....	.....	15	1,919
8.....	50	15,909	21	9,709	25	5,529	4	611
9.....	144	61,727	144	61,727	.....	.....	.....	.....
10.....	566	191,783	272	115,659	227	65,557	67	10,567
11.....	32	9,589	32	9,589	.....	.....	.....	.....
12.....	76	20,485	24	9,208	46	10,347	6	930
13.....	94	19,822	15	7,150	76	12,272	3	400
14.....	363	116,167	303	106,967	20	2,200	40	7,000
15.....	204	66,197	177	62,147	.....	.....	27	4,050
16.....	846	331,324	564	275,061	257	49,969	25	6,294
17.....	1986	768,860	1942	761,368	1	360	43	7,132
18.....	125	65,266	125	65,266	.....	.....	.....	.....
19.....	240	76,323	171	62,951	43	9,201	26	4,171
20.....	1402	458,086	887	361,062	441	86,550	74	10,474
21.....	2992	1,423,132	2687	1,422,031	2	635	3	466
22.....	77	22,651	47	17,153	22	4,585	8	913
23.....	127	45,388	120	43,682	7	1,706	.....	.....
24.....	169	713,901	1655	704,689	32	7,452	5	1,760
25.....	5497	2,948,947	5488	2,946,013	4	1,284	5	1,650
26.....	85	51,207	85	51,207	.....	.....	.....	.....
27.....	1133	588,653	1099	582,144	22	4,951	12	1,558
28.....	.....	.....	.....	.....	.....	.....	.....	.....
29.....	1303	568,041	1030	497,380	261	68,989	12	1,672
30.....	1340	303,286	147	66,182	1178	235,304	15	1,800
31.....	775	127,451	21	9,700	753	117,655	1	96
32.....	65	9,706	4	2,466	61	7,240	.....	.....
33.....	80	31,270	48	23,405	31	7,709	1	156
34.....	175	73,063	149	60,811	26	6,212	.....	.....
35.....	559	145,420	249	95,637	307	49,273	3	510
36.....	440	165,904	421	162,874	1	250	18	2,850
37.....	10	3,556	7	2,880	3	676	.....	.....
38.....	64	24,740	43	19,362	19	5,035	2	336
39.....	41	19,575	41	19,575	.....	.....	.....	.....
40.....	41	7,700	7	5,000	34	2,700	.....	.....
41.....	7	1,610	1	290	6	1,320	.....	.....
42.....	1285	526,479	1224	512,119	40	13,570	12	790
43.....	69	209,031	366	163,908	208	41,001	35	4,122
44.....	2372	1,088,312	2206	1,077,040	14	2,130	62	9,142
45.....	609	184,710	321	114,630	266	54,575	112	15,505
46.....	65	23,225	9	6,496	56	10,729	.....	.....
47.....	33	7,119	4	1,356	29	5,761	.....	.....
48.....	98	40,242	93	47,998	4	1,078	1	166
49.....	850	292,080	766	274,869	24	6,396	60	10,815
50.....	14	7,640	11	6,588	3	1,052	.....	.....
51.....	226	118,307	225	118,151	.....	.....	1	156
52.....	11	5,100	11	5,100	.....	.....	.....	.....
53.....	174	56,958	50	29,310	114	26,948	10	700

MANUFACTURES IN IOWA BY SPECIFIED

Running number.	MANUFACTURING AND MECHANICAL INDUSTRIES.	Salaried officials, clerks, etc.	
		No.	Salaries.
54	Grease and tallow	5	1,530
55	Hair work .....	...	...
56	Hardware	27	24,561
57	Ice, artificial	10	3,055
58	Iron work, architectural and ornamental	25	22,166
59	Jewelry	2	1,150
60	Kindling wood	4	3,000
61	Lime and cement	38	26,588
62	Liquors, malt	58	84,130
63	Liquors, vinous .....	...	...
64	Lock and gun smithing .....	...	...
65	Looking-glass and picture frames	6	2,715
66	Lumber and timber products	145	173,768
67	Lumber, planing mill products, including sash, doors and blinds	187	180,435
68	Marble and stone work	11	7,700
69	Masonry, brick and stone	20	24,582
70	Mattresses and spring beds	17	10,972
71	Millinery, custom work	90	26,617
72	Mineral and soda waters	34	25,006
73	Models and patterns	3	2,700
74	Monuments and tombstones	71	39,480
75	Musical instruments and materials, not specified	3	150
76	Oil, linseed	24	42,666
77	Painting, house, sign, etc.	33	18,055
78	Paints	31	23,480
79	Paper and wood pulp	11	11,770
80	Paper hanging	17	7,641
81	Patent medicines and compounds	206	390,531
82	Paving and paving materials	9	4,400
83	Perfumery and cosmetics	69	31,968
84	Photography	10	3,641
85	Pickles, preserves and sauces	45	47,665
86	Plastering and stucco work	3	1,810
87	Plumbing and gas and steam fitting	46	24,992
88	Pottery, terra cotta and fire clay products	13	13,350
89	Printing and publishing, book and job	141	103,761
90	Printing and publishing, newspapers and periodicals	523	398,065
91	Roofing and roofing materials	6	3,010
92	Rubber and elastic goods	1	520
93	Saddlery and harness	115	56,954
94	Sausage .....	...	...
95	Scales and balances	1	400
96	Sewing machine repairing .....	...	...
97	Ship and boat building, wooden	7	4,700
98	Shirts .....	...	...
99	Show cases	1	200
100	Slaughtering and meat packing, wholesale	19	196,056
101	Slaughtering, wholesale, not including meat packing	3	1,320
102	Soap and candles	33	30,072
103	Starch	35	37,842
104	Steam fittings and heating apparatus	10	8,840
105	Sugar and molasses, refining	17	13,460
106	Tinsmithing, coppersmithing and sheet-iron working	49	32,580
107	Tobacco, cigars and cigarettes	126	117,006
108	Tools, not elsewhere specified	15	11,191
109	Trunks and valises	2	1,100
110	Upholstering materials	6	4,490
111	Vinegar and cider	25	23,589
112	Washing machines and clothes wringers	1	520
113	Watch, clock and jewelry repairing	4	1,887
114	Windmills	4	5,200
115	Window shades .....	...	...
116	Wire-work, including wire rope and cable	20	11,134
117	Wood, turned and carved	1	600
118	Woolen goods	26	16,611
119	All other industries	177	189,415

INDUSTRIES—1900—CONTINUED.

RUNNING NUMBER.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.							
	Total.		Men, 16 years and over.		Women, 16 years and over.		Children, Under 16 years.	
	Av. No.	Wages.	Av. No.	Wages.	Av. No.	Wages.	Av. No.	Wages.
54	10	3,987	10	3,987				
55	14	3,826	2	936	12	2,890		
56	244	64,530	223	59,830	21	4,709		
57	33	15,067	33	15,067				
58	189	79,613	187	79,427			2	186
59	16	8,865	16	8,865				
60	30	7,383	30	7,383				
61	302	145,382	300	144,662			2	720
62	321	189,916	317	189,366			4	550
63	2	578	2	578				
64	16	7,490	14	7,456			2	243
65	40	16,167	36	14,976	4	1,191		
66	2793	1,046,181	2677	1,028,758	5	1,229	111	16,194
67	2372	983,924	2326	972,611			46	11,313
68	352	161,363	344	160,016			8	1,347
69	1124	570,496	1123	570,456			1	104
70	49	16,738	38	13,468	11	3,270		
71	1258	282,940	5	4,170	1244	277,942	9	828
72	152	58,757	144	57,638	3	419	5	700
73	11	3,786	7	2,756	3	780	1	250
74	328	177,585	327	177,225	1	360		
75	9	4,740	9	4,740				
76	84	44,973	84	44,973				
77	766	331,670	762	330,180	2	1,292	2	260
78	40	14,739	34	13,510	6	1,229		
79	180	63,589	132	55,374	28	4,964	20	3,251
80	121	65,293	121	65,177				
81	102	65,784	102	66,480	80	19,204	1	100
82	330	114,410	326	113,428	2	600	2	382
83	38	9,611	10	4,111	23	4,820	5	680
84	104	72,555	95	43,209	98	29,271	1	75
85	322	69,066	164	43,534	151	25,012	7	460
86	151	64,570	151	64,570				
87	729	374,470	724	373,620	2	516	3	334
88	234	93,299	233	93,024				
89	855	345,665	677	301,999	156	40,706	22	2,960
90	3393	1,311,170	2324	1,107,349	596	148,477	473	55,353
91	97	31,718	96	31,562	1	272		
92	3	1,070	2	800	1	270		
93	1230	493,651	1210	490,626	9	1,919	11	1,106
94	13	6,500	13	6,500				
95	37	18,704	37	18,704				
96								
97	38	13,430	38	13,430				
98	33	11,232	2	836	31	10,396		
99	9	5,410	9	5,410				
100	2874	1,201,681	2630	1,156,935	29	9,906	215	34,840
101	13	6,486	13	6,486				
102	105	38,388	76	34,047	22	3,651	7	690
103	327	114,881	248	97,050	77	17,331	2	500
104	53	24,107	53	24,107				
105	42	20,000	42	15,260	20	4,620	1	120
106	942	423,170	893	416,271	41	5,568	8	1,331
107	1856	700,777	1143	536,622	559	144,534	154	19,621
108	65	26,697	50	22,347	14	4,200	1	150
109	17	6,192	16	6,088			1	104
110	54	13,477	54	13,477				
111	29	10,680	23	9,627	6	1,053		
112	30	10,120	25	9,600			5	520
113	264	132,586	254	130,917	4	1,055	6	614
114	72	43,111	69	41,705	3	1,406		
115	2	1,024	2	1,024				
116	103	40,984	100	39,884			3	1,100
117	48	14,590	48	14,590				
118	256	64,596	126	39,576	128	24,647	2	373
119	1555	703,262	1379	673,680	146	26,141	30	3,441

MANUFACTURES IN IOWA BY SPECIFIED

Running number.	MANUFACTURING AND MECHANICAL INDUSTRIES.	MISCELLANEOUS EXPENSES.		
		Total.	Rent of works.	Taxes, not including intern ^l rev.
1	ALL INDUSTRIES.....	\$7,988,767	\$1,166,867	\$547,635
2	Agricultural implements.....	95,540	1,807	7,085
3	Awnings, tents and sails.....	8,097	2,736	408
4	Axle grease.....	21,932	36	209
5	Baking and yeast powders.....	4,384	610	33
6	Bicycle and tricycle repairing.....	20,496	12,941	688
7	Blacksmithing and wheelwrighting.....	124,716	60,475	18,021
8	Bookbinding and blank book making.....	8,143	2,511	256
9	Boots and shoes, custom work and repairing.....	29,418	24,049	1,253
10	Boots and shoes, factory product.....	18,718	1,732	2,174
11	Bottling.....	8,110	2,195	300
12	Boxes, cigar.....	3,721	508	260
13	Boxes, fancy and paper.....	3,068	2,340	211
14	Boxes, wooden packing.....	27,219	915	1,976
15	Brass castings and brass finishing.....	23,418	138	906
16	Bread and other bakery products.....	119,837	40,052	8,857
17	Brick and tile.....	115,807	11,509	14,462
18	Bridges.....	28,067	1,155	462
19	Brooms and brushes.....	8,883	3,542	811
20	Buttons.....	37,252	4,624	1,255
21	Carpentering.....	509,540	24,075	6,367
22	Carpets, rag.....	4,419	2,761	312
23	Carriage and wagon materials.....	8,275	1,234	1,126
24	Carriages and wagons.....	243,794	19,378	24,471
25	Cars and general shop construction and repairs by steam railroad companies.....	124,453	.....	36,894
26	Cars and general shop construction and repairs by street railroad companies.....	880	.....	380
27	Cheese, butter and condensed milk, factory product.....	153,990	12,089	17,039
28	China decorating.....	125	118	2
29	Clothing, mens', custom work and repairing.....	122,672	75,656	5,452
30	Clothing, mens', factory product.....	95,446	12,854	5,301
31	Clothing, womens', dressmaking.....	25,380	20,413	952
32	Clothing, womens', factory product.....	1,630	983	3
33	Coffee and spice, roasting and grinding.....	16,066	4,409	2,521
34	Coffins, burial cases and undertakers' goods.....	13,785	.....	2,158
35	Confectionery.....	59,311	19,670	2,807
36	Cooperage.....	16,077	3,231	2,376
37	Druggists' preparations, not including prescriptions.....	8,272	595	185
38	Dyeing and cleaning.....	14,219	5,181	399
39	Electrical construction and repairs.....	4,415	2,662	227
40	Fancy articles, not elsewhere specified.....	834	341	125
41	Flavoring extracts.....	2,199	1,200	70
42	Flouring and grist mill products.....	304,250	18,387	45,395
43	Food preparations.....	194,297	2,026	2,152
44	Foundry and machine shop products.....	200,918	22,534	19,184
45	Fruits and vegetables, canning and preserving.....	63,185	225	3,852
46	Fur goods.....	10,435	5,279	415
47	Furnishing goods, mens'.....	6,321	1,071	165
48	Furniture, cabinet-making, repairing and upholstering.....	14,013	9,214	1,145
49	Furniture, factory product.....	108,809	10,391	6,374
50	Furs, dressed.....	1,932	444	58
51	Gas, illuminating and heating.....	259,017	.....	30,295
52	Gas machines and meters.....	1,602	557	20
53	Gloves and mittens.....	15,009	1,572	1,067
54	Grease and tallow.....	1,682	120	135
55	Hair work.....	1,700	1,202	57
56	Hardware.....	30,708	348	557
57	Ice, artificial.....	9,014	606	875
58	Iron work, architectural and ornamental.....	20,680	1,248	1,059
59	Jewelry.....	6,522	.....	17
60	Kindling wood.....	2,362	81	54
61	Lime and cement.....	68,488	7,072	2,580
62	Liquors, malt.....	736,550	15,050	12,775
63	Liquors, vinous.....	322	125	47

INDUSTRIES—1900—CONTINUED.

RUNNING NUMBER.	MISCELLANEOUS EXPENSES—CON.		COST OF MATERIALS USED.			Value of products, including custom work and repairing.
	Rent of offices, interest, etc	Contract work.	Total.	Principal materials, including mill supplies and freight.	Fuel and rent of power and heat.	
1	85,502,216	8682,037	\$101,170,357	\$ 98,911,434	\$2,258,923	\$164,617,877
2	87,545	103	669,989	650,012	19,977	1,508,667
3	4,953		4,093	47,604	469	101,303
4	21,687		47,857	47,506	351	132,101
5	3,741		13,183	13,008	85	28,335
6	6,513	354	86,014	83,201	2,813	218,554
7	44,061	1,259	1,004,390	904,547	99,843	3,361,298
8	1,641	3,536	27,649	26,980	669	83,391
9	3,046	170	150,285	145,530	4,755	422,336
10	14,812		507,492	502,829	4,663	766,141
11	5,615		60,530	59,793	737	114,666
12	2,843		50,125	49,373	752	90,544
13	517		26,503	25,437	1,066	59,990
14	20,548	3,780	542,745	541,238	1,507	852,667
15	22,374		135,337	132,737	2,600	263,090
16	69,567	1,361	1,427,765	1,386,048	41,717	2,673,788
17	83,732	6,194	460,313	81,413	378,900	1,970,323
18	24,210	2,240	179,412	178,867	545	306,844
19	4,530		151,621	149,067	2,554	348,448
20	26,753	4,620	196,842	183,810	13,032	866,539
21	24,205	444,833	3,627,095	3,615,648	11,447	6,802,393
22	1,324	2	22,353	20,683	1,670	101,246
23	6,855	60	153,715	151,434	2,281	259,523
24	198,475	1,470	1,863,988	1,826,384	37,604	3,931,007
25	87,559		2,896,269	2,795,055	101,214	6,221,378
26	500		36,699	32,399	4,300	97,186
27	121,816	3,046	13,501,556	13,255,944	245,612	15,846,077
28	15		715	610	105	2,300
29	34,150	7,414	816,380	802,714	13,666	2,111,151
30	77,231		910,106	903,944	6,162	1,534,697
31	4,003	12	112,987	108,968	4,019	459,157
32	550	103	25,284	24,798	486	46,998
33	10,036		795,613	789,784	5,829	970,962
34	11,627		226,400	225,285	1,115	399,462
35	33,834		716,901	705,713	11,188	1,264,530
36	10,470		457,477	452,196	5,281	719,635
37	7,492		17,851	17,696	155	45,344
38	8,639		12,716	9,205	3,511	96,528
39	1,520		80,248	79,600	648	134,385
40	368		3,895	3,870	25	10,850
41	863		15,731	15,656	75	30,340
42	239,832	672	11,272,217	11,075,461	196,756	13,823,083
43	192,119		2,388,003	2,355,730	32,273	3,664,031
44	148,782	10,418	2,189,660	2,094,681	94,979	4,460,914
45	57,508	1,600	767,231	755,874	11,357	1,359,958
46	4,741		63,840	63,700	140	136,788
47	5,585		53,329	53,133	196	78,700
48	3,654		123,191	121,432	1,759	266,213
49	74,096	17,948	746,574	734,412	12,162	1,419,862
50	1,430		6,615	5,131	1,484	24,598
51	228,722		203,961	190,731	13,230	807,787
52	955		15,748	15,603	145	32,835
53	12,300	50	124,754	122,575	2,179	283,920
54	1,427		77,725	76,204	1,521	92,423
55	440		4,766	4,631	135	16,410
56	29,803		108,811	103,915	4,896	311,737
57	7,443		10,530	2,758	7,772	108,400
58	7,990	10,377	300,714	298,005	2,709	512,909
59	95		8,654	8,368	286	32,900
60	2,227		8,933	8,658	275	23,554
61	27,672	31,164	181,514	139,950	41,564	543,267
62	708,725		385,164	331,304	53,860	1,713,911
63	150		1,410	1,410		4,119

MANUFACTURES IN IOWA BY SPECIFIED

Running number.	MANUFACTURING AND MECHANICAL INDUSTRIES.	MISCELLANEOUS EXPENSES.		
		Total.	Rent of works	Taxes, not including intern ^l rev.
64	Lock and gun smithing	5,418	4,117	265
65	Looking-glass and picture frames.....	7,652	4,114	367
66	Lumber and timber products.....	342,386	7,102	65,549
67	Lumber, planing mill products, including sash, doors and blinds	255,979	11,521	23,027
68	Marble and stone work	15,957	1,799	1,742
69	Masonry, brick and stone	44,432	6,359	998
70	Mattresses and spring beds.....	10,611	1,995	193
71	Millinery, custom work	170,220	116,735	9,760
72	Mineral and soda waters	42,007	5,359	2,601
73	Models and patterns	943	376	114
74	Monuments and tombstones	48,117	13,886	4,315
75	Musical instruments and materials, not specified..	2,864	1,259	52
76	Oil, linseed.....	61,932	.....	4,809
77	Painting, house, sign, etc.....	38,286	22,285	1,471
78	Paints.....	19,833	20	783
79	Paper and wood pulp	13,350	2,500	115
80	Paper hanging.....	10,374	5,795	508
81	Patent medicines and compounds.....	201,398	8,853	2,086
82	Paving and paving materials	7,293	1,469	250
83	Perfumery and cosmetics	20,216	1,544	406
84	Photography.....	70,009	45,051	2,078
85	Pickles, preserves and sauces.....	39,651	1,789	4,005
86	Plastering and stucco work	7,344	1,557	62
87	Plumbing and gas and steam fitting.....	67,186	31,483	4,138
88	Pottery, terra cotta and fire clay products	24,562	.....	2,093
89	Printing and publishing, book and job.....	89,247	31,342	6,310
90	Printing and publishing, newspapers and periodicals...	444,690	101,133	22,154
91	Roofing and roofing materials.....	5,979	2,695	338
92	Rubber and elastic goods.....	587	285	.....
93	Saddlery and harness.....	168,252	72,888	21,559
94	Sausage	1,000	660	255
95	Scales and balances	3,528	1,795	499
96	Sewing machine repairing	637	272	.....
97	Ship and boat building, wooden	1,180	315	228
98	Shirts	1,344	991	39
99	Show cases	1,300	1,230	.....
100	Slaughtering and meat packing, wholesale	437,103	4,139	19,345
101	Slaughtering, wholesale, not including meat packing ..	4,883	.....	831
102	Soap and candles	34,722	3,965	1,427
103	Starch	59,192	180	2,375
104	Steam fittings and heating apparatus	5,351	540	269
105	Sugar and molasses, refining	14,627	21	1,015
106	Tinsmithing, coppersmithing and sheet-iron working...	99,450	42,721	9,068
107	Tobacco, cigars and cigarettes.....	412,818	52,843	8,647
108	Tools, not elsewhere specified.....	3,334	125	872
109	Trunks and valises	4,010	2,032	299
110	Upholstering materials	1,179	.....	124
111	Vinegar and cider	11,470	87	665
112	Washing machines and clothes wringers	1,878	390	92
113	Watch, clock and jewelry repairing.....	65,264	44,041	4,535
114	Windmills.....	7,431	652	1,006
115	Window shades.....	235	105	30
116	Wire-work, including wire rope and cable.....	24,708	2,592	608
117	Wood, turned and carved	1,606	287	187
118	Woollen goods	16,831	650	2,726
119	All other industries*	350,842	21,172	12,148

* Embraces artificial limbs, 1; baskets and rattan and willow ware, 2; bells, 1; bicycles and arations, 2; cordage and twine, 1; cutlery and edge tools, 1; dentists' materials, 2; electrical wood, 1; explosives, 1; fertilizers, 1; gas and lamp fixtures, 2; glass, cutting, staining and including fur hats, and wool hats, 1; hosiery and knit goods, 2; lamps and reflectors, 2; lead, marble and marbleized, 1; mirrors, 1; musical instruments, organs and materials, 1; oil, not 2; paper hangings, 1; pens, fountain and stylographic, 1; photographic materials, 2; pipes, steam pumps, 2; refrigerators, 1; saws, 1; ship-building, iron and steel, 1; stereotyping and 1; typewriters and supplies, 1; typewriter repairing, 1; woodenware, not elsewhere specified, 2.

INDUSTRIES—1900—CONTINUED.

RUNNING NUMBER.	MISCELLANEOUS EXPENSES—CON.		COST OF MATERIALS USED.			Value of products, including custom work and repairing.
	Rent of offices, interest, etc.	Contract work.	Total.	Principal materials, including mill supplies and freight.	Fuel and rent of power and heat.	
64	1,036		11,220	10,286	934	43,747
65	1,871	1,300	45,195	44,674	521	94,255
66	269,735		6,324,034	6,323,984	50	8,677,058
67	221,431		3,195,243	3,172,827	22,416	5,295,546
68	11,016	1,400	102,503	95,841	6,662	355,046
69	17,075	20,000	1,022,997	1,021,394	1,603	1,910,219
70	7,998	425	88,468	86,798	1,670	148,660
71	42,930	795	1,390,783	1,375,797	14,986	2,624,182
72	33,951	96	146,803	142,881	3,922	428,913
73	493		2,365	1,941	424	13,775
74	29,666	250	630,514	626,901	3,613	1,267,459
75	1,553		32,552	32,396	156	70,148
76	57,123		1,456,798	1,441,403	15,395	1,612,798
77	14,430	100	337,395	335,825	1,570	1,010,569
78	19,030		255,510	250,952	4,558	336,867
79	10,735		106,615	89,078	17,537	243,776
80	3,981		84,045	83,810	235	210,904
81	190,444	15	300,883	298,174	2,709	1,360,643
82	5,574		157,740	156,747	993	358,485
83	18,366		39,965	39,588	377	121,129
84	20,627	1,353	213,677	204,860	8,817	712,215
85	33,857		414,637	409,314	5,323	862,435
86	965	4,760	77,717	77,601	116	200,414
87	30,923	642	925,992	919,276	6,716	1,780,035
88	22,219	250	57,267	10,811	46,456	248,597
89	44,520	7,066	411,711	393,957	17,754	1,210,110
90	286,431	34,972	1,082,549	1,014,827	67,722	4,935,453
91	2,946		84,088	83,767	721	165,474
92	302		2,905	2,878	27	5,871
93	67,768	6,037	1,705,432	1,681,581	23,851	3,273,972
94	85		47,835	47,430	405	67,800
95	1,333		22,401	21,139	1,262	58,214
96	365		1,260	1,190	70	3,780
97	637		13,207	12,603	604	42,665
98	314		6,509	6,219	290	32,388
99	70		6,859	6,694	165	16,427
100	413,628		21,195,066	21,054,250	140,816	25,296,518
101	4,052		361,578	360,528	1,050	398,526
102	29,330		407,150	400,041	7,109	600,715
103	56,637		623,814	586,630	37,184	896,831
104	4,575		36,029	36,179	850	93,429
105	13,591		130,675	127,345	3,330	215,388
106	47,661	600	1,058,971	1,039,638	19,333	2,208,289
107	351,178	150	948,991	940,300	8,691	2,576,384
108	2,337		95,440	92,249	3,191	192,187
109	1,679		16,300	15,804	496	42,006
110	1,005		26,362	25,120	1,242	70,827
111	9,918		62,802	58,685	4,117	130,453
112	1,390		22,000	21,745	1,155	46,550
113	15,161	1,527	147,361	141,191	6,170	625,283
114	5,773		62,016	61,030	986	129,689
115	100		3,545	3,545		6,200
116	21,548		226,015	222,419	3,596	370,669
117	1,132		18,280	16,546	1,734	64,036
118	13,455		175,426	169,383	6,043	296,500
119	270,009	47,513	3,621,494	3,403,420	218,074	5,700,387

tricycles, 1; brassware, 1; butter, re-working, 1; charcoal, 2; cleansing and polishing pre-apparatus and supplies, 2; electroplating, 2; enameling and enameled goods, 1; engraving, ornamenting, 2; glucose, 2; hand stamps, 2; hardware, saddlery, 1; hats and caps, not naming and refining, 1; leather, tanned, curried and finished, 2; malt, 2; mantels, slate, elsewhere specified, 1; oysters, canning and preserving, 1; paper goods, not elsewhere specified, tobacco, 1; plumbers' supplies, 1; printing and publishing, music, 2; pumps, not including electrotyping, 2; surgical appliances, 2; tobacco, chewing, smoking, and snuff, 2; toys and games,

TABLE
Manufactures in Iowa

Running number.	COUNTIES.	Number of establishments.	CAPITAL.	
			Total.	Land.
1	The State.....	14,819	\$102,733,103	\$ 11,701,330
2	Adair.....	77	122,020	7,903
3	Adams.....	59	160,487	21,130
4	Allamakee.....	116	365,700	40,666
5	Appanoose.....	135	252,660	38,780
6	Audubon.....	62	132,450	10,190
7	Benton.....	183	466,102	52,090
8	Black Hawk.....	274	2,104,542	208,214
9	Boone.....	184	536,701	61,040
10	Bremer.....	145	400,822	45,240
11	Buchanan.....	163	506,090	60,190
12	Buena Vista.....	107	235,566	29,060
13	Butler.....	140	314,878	35,155
14	Calhoun.....	119	268,593	30,700
15	Carroll.....	125	327,945	28,363
16	Cass.....	138	386,484	42,355
17	Cedar.....	125	449,200	56,215
18	Cerro Gordo.....	162	510,319	72,740
19	Cherokee.....	83	214,786	22,602
20	Chickasaw.....	131	293,617	33,071
21	Clarke.....	38	87,686	14,350
22	Clay.....	53	167,613	24,615
23	Clayton.....	213	644,521	37,555
24	Clinton.....	380	4,750,638	516,496
25	Crawford.....	77	222,037	24,030
26	Dallas.....	124	316,986	22,355
27	Davis.....	87	164,959	32,100
28	Decatur.....	92	203,383	16,915
29	Delaware.....	155	415,434	52,825
30	Des Moines.....	370	5,674,811	1,321,484
31	Dickinson.....	54	163,884	15,083
32	Embuque.....	609	8,478,553	900,837
33	Emmet.....	51	176,162	9,004
34	Fayette.....	220	1,022,954	55,940
35	Floyd.....	118	411,891	69,755
36	Franklin.....	56	165,013	16,525
37	Fremont.....	120	249,040	25,501
38	Greene.....	85	239,632	26,450
39	Grundy.....	86	178,286	11,480
40	Guthrie.....	104	275,509	20,590
41	Hamilton.....	86	467,471	42,270
42	Hancock.....	79	173,703	20,400
43	Hardin.....	195	520,270	63,340
44	Harrison.....	125	308,191	30,220
45	Henry.....	130	347,855	21,780
46	Howard.....	116	283,808	20,509
47	Humboldt.....	95	239,877	21,205
48	Ida.....	72	265,996	21,190
49	Iowa.....	114	247,008	23,045
50	Jackson.....	207	655,345	64,514

No. 2.

by Counties: 1900.

RUNNING NUMBER.	CAPITAL.			
	Buildings.	Machinery, tools and im- plements	Cash and sundries.	Propri- etors and firm mem- bers.
1.....	\$ 18,554,185	\$ 26,150,011	\$ 46,327,577	16,619
2.....	30,741	44,785	32,597	95
3.....	27,335	59,255	52,707	67
4.....	85,971	101,897	137,175	135
5.....	57,645	101,583	54,702	138
6.....	30,465	47,760	44,035	64
7.....	123,850	123,034	167,128	217
8.....	366,196	524,334	915,798	273
9.....	78,400	135,726	261,535	224
10.....	105,050	118,401	132,131	152
11.....	102,475	174,620	168,805	172
12.....	59,014	78,855	68,637	124
13.....	83,855	93,714	122,154	149
14.....	43,040	80,740	114,113	134
15.....	54,760	97,802	147,020	120
16.....	74,475	102,640	167,014	183
17.....	98,430	129,390	165,174	145
18.....	105,502	137,108	194,090	189
19.....	45,315	70,997	75,784	92
20.....	67,823	98,072	100,611	136
21.....	12,855	27,600	32,881	45
22.....	36,410	59,227	47,361	61
23.....	104,840	194,390	307,736	235
24.....	387,261	841,428	3,011,453	319
25.....	46,165	74,760	77,082	90
26.....	76,595	109,430	108,606	158
27.....	23,665	58,722	50,472	105
28.....	49,230	61,563	75,735	109
29.....	104,170	133,565	124,874	159
30.....	669,505	1,383,868	2,299,954	390
31.....	33,300	57,595	57,906	65
32.....	1,354,364	1,344,822	4,880,530	675
33.....	41,325	53,353	72,480	53
34.....	431,804	257,715	277,495	245
35.....	91,002	108,146	142,988	134
36.....	28,275	66,644	53,569	62
37.....	45,870	89,429	88,246	153
38.....	65,067	64,787	83,328	169
39.....	49,470	57,218	60,118	107
40.....	75,970	92,743	86,206	114
41.....	105,573	129,352	190,276	91
42.....	44,210	56,281	52,810	80
43.....	107,423	167,364	182,149	226
44.....	66,760	87,972	123,169	130
45.....	65,347	148,191	112,537	168
46.....	66,600	76,050	120,589	139
47.....	54,025	86,328	78,229	96
48.....	49,175	75,090	120,541	89
49.....	65,870	83,480	74,613	142
50.....	128,535	201,349	260,947	228

TABLE No. 2—
Manufactures in Iowa

Running Number.	COUNTIES.	Number of establishments.	CAPITAL.	
			Total.	Land.
51	Jasper	185	\$ 684,469	\$ 41,410
52	Jefferson	76	537,929	21,780
53	Johnson	184	1,275,668	107,810
54	Jones	169	568,490	63,242
55	Keokuk	181	377,600	32,825
56	Kossuth	86	256,168	21,830
57	Lee	329	4,192,064	237,730
58	Linn	470	6,657,081	509,865
59	Louisa	48	158,117	9,200
60	Lucas	73	157,642	11,570
61	Lyon	68	199,763	16,940
62	Madison	90	156,011	16,700
63	Mahaska	200	672,834	67,065
64	Marion	123	408,254	27,845
65	Marshall	226	6,245,431	1,507,080
66	Mills	78	175,701	13,330
67	Mitchell	96	225,768	33,585
68	Monona	75	172,517	13,175
69	Monroe	82	130,066	10,685
70	Montgomery	127	414,032	30,440
71	Muscatine	315	3,886,703	231,745
72	O'Brien	103	327,134	22,075
73	Osceola	44	90,874	11,250
74	Page	176	497,915	55,000
75	Palo Alto	101	248,377	23,849
76	Plymouth	141	799,499	133,130
77	Pocahontas	76	170,030	16,530
78	Polk	547	8,050,680	576,157
79	Pottawattamie	324	1,426,472	134,050
80	Poweshiek	144	961,275	26,727
81	Ringgold	76	87,005	8,950
82	Sac	115	264,203	21,755
83	Scott	470	10,990,549	1,904,188
84	Shelby	72	150,115	11,947
85	Sioux	145	377,886	32,600
86	Story	148	342,615	29,715
87	Tama	147	529,082	70,505
88	Taylor	117	170,907	15,523
89	Union	137	451,870	30,465
90	Van Buren	124	594,371	37,785
91	Wapello	208	3,472,004	99,570
92	Warren	103	215,941	26,607
93	Washington	137	442,276	47,735
94	Wayne	102	196,345	18,305
95	Webster	172	1,536,942	150,864
96	Winnebago	78	230,456	16,000
97	Winnesiek	174	601,851	52,413
98	Woodbury	398	5,950,223	535,968
99	Worth	72	155,506	16,015
100	Wright	104	281,030	18,715

CONTINUED.

by Counties: 1900.

RUNNING NUMBER.	CAPITAL.			
	Buildings.	Machinery, tools and implements.	Cash and sundries	Proprietor and firm members.
51	\$ 92,143	\$ 131,159	\$ 419,757	210
52	61,020	120,209	335,000	83
53	219,440	358,001	590,717	198
54	162,383	177,166	165,699	179
55	101,540	106,102	137,133	231
56	62,073	87,775	84,490	80
57	609,573	990,822	2,353,939	341
58	1,411,522	1,541,738	3,194,856	546
59	32,200	36,670	80,047	58
60	23,647	36,368	86,057	85
61	44,006	68,045	70,172	75
62	25,280	44,031	70,000	101
63	110,705	182,113	312,951	239
64	60,700	100,528	219,181	152
65	1,656,605	1,817,785	1,263,061	252
66	42,000	64,524	55,847	84
67	53,010	72,800	60,373	105
68	35,100	43,480	80,762	86
69	24,340	38,525	56,516	91
70	91,300	132,846	159,446	149
71	343,051	724,847	2,587,060	377
72	67,000	96,158	141,901	117
73	24,255	30,476	24,893	47
74	108,547	141,302	193,006	208
75	47,995	73,794	102,739	106
76	174,010	219,932	242,427	140
77	41,555	60,736	57,218	83
78	934,341	2,398,147	4,142,044	569
79	233,755	454,158	604,509	355
80	74,378	98,378	761,812	176
81	19,765	29,540	28,750	91
82	63,154	89,745	89,549	135
83	2,227,351	2,980,106	3,878,814	517
84	30,300	55,138	52,530	79
85	95,235	112,793	137,198	162
86	80,500	96,780	135,650	169
87	107,120	222,083	129,374	182
88	37,475	54,806	63,013	130
89	144,642	174,470	102,293	140
90	116,997	164,581	275,008	156
91	567,780	477,623	2,327,631	250
92	43,625	58,630	75,073	131
93	92,975	101,649	199,917	157
94	41,805	57,060	79,185	130
95	343,725	564,059	478,504	177
96	37,825	66,465	80,166	82
97	141,345	148,223	259,370	180
98	1,158,774	1,508,541	2,746,940	449
99	40,775	55,135	43,581	71
100	68,120	85,930	108,259	115

TABLE No. 2—
Manufactures in Iowa

Running number.	COUNTIES.	Salaried officials, clerks, etc.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.			
				Total.		Men, 16 years and over	
				Average number.	Wages.	Average number.	Wages.
1	The State	5664	\$ 4,486,117	58553	\$ 23,931,680	48417	\$ 21,893,983
2	Adair	3	864	68	24,091	55	21,509
3	Adams	6	3,176	79	29,475	68	26,706
4	Allamakee	18	4,309	225	80,809	206	76,845
5	Appanoose	17	8,351	246	96,533	198	87,726
6	Audubon	7	627	80	32,164	62	29,446
7	Benton	21	11,872	466	166,212	375	147,398
8	Black Hawk	152	105,978	1,435	625,649	1,210	584,698
9	Boone	33	21,322	762	346,234	664	329,615
10	Bremer	33	7,262	189	71,411	162	65,430
11	Buchanan	20	8,282	254	96,481	215	90,070
12	Buena Vista	8	3,810	102	42,112	85	38,938
13	Butler	20	8,273	116	49,483	98	45,281
14	Calhoun	9	5,555	219	100,244	185	94,260
15	Carroll	10	5,717	152	63,454	120	56,864
16	Cass	7	3,580	299	109,111	217	95,580
17	Cedar	5	3,520	247	117,160	222	112,571
18	Cerro Gordo	30	20,586	425	185,226	365	173,280
19	Cherokee	2	1,400	96	43,320	80	39,958
20	Chickasaw	22	5,968	157	58,927	130	53,486
21	Clarke	6	2,100	46	20,220	40	19,395
22	Clay	5	3,800	56	21,268	48	20,358
23	Clayton	29	8,403	372	119,262	336	113,189
24	Clinton	207	235,512	3,147	1,161,486	2,794	1,090,863
25	Crawford	1	1,000	94	34,863	80	32,411
26	Dallas	8	5,648	152	53,099	128	48,160
27	Davis	6	1,582	114	30,786	82	26,156
28	Decatur	8	3,630	103	38,155	83	34,006
29	Delaware	28	8,119	236	92,157	192	85,365
30	Des Moines	338	228,417	3,178	1,308,537	2,774	1,239,360
31	Dickinson	1	150	42	20,793	37	19,274
32	Dubuque	612	459,393	5,662	2,076,348	4,383	1,846,411
33	Emmet	8	2,530	69	32,393	65	31,341
34	Fayette	35	15,320	742	349,390	674	338,335
35	Floyd	12	5,806	253	101,770	226	96,380
36	Franklin	5	2,315	58	26,387	51	24,067
37	Fremont	3	1,100	135	43,492	110	39,740
38	Greene	6	4,120	137	59,950	104	53,245
39	Grundy	2	840	65	27,215	57	25,120
40	Guthrie	5	1,370	158	51,226	126	45,882
41	Hamilton	29	15,942	251	98,434	218	90,283
42	Hancock	6	1,400	75	31,048	59	29,520
43	Hardin	14	5,520	297	128,540	259	120,274
44	Harrison	18	11,243	582	274,049	536	267,709
45	Henry	13	7,121	181	59,651	135	52,881
46	Howard	13	5,803	145	53,398	130	50,095
47	Humboldt	12	3,860	70	30,328	62	28,228
48	Ida	4	2,428	94	38,087	79	34,956
49	Iowa	7	2,091	118	45,259	101	41,000
50	Jackson	23	9,666	420	158,629	372	148,255

CONTINUED.

by Counties: 1900.

RUNNING NUMBER.	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.			
	Women, over 16 years.		Children under 16 years.	
	Average number.	Wages.	Average number.	Wages.
1	8248	\$ 1,766,586	1888	\$ 271,111
2	9	1,993	4	589
3	10	2,719	1	50
4	15	3,558	4	406
5	41	8,007	7	800
6	17	2,628	1	90
7	75	16,249	16	2,565
8	106	36,710	29	4,241
9	68	14,005	30	2,614
10	19	4,660	8	1,321
11	28	4,975	11	1,436
12	16	3,124	1	50
13	15	3,842	3	360
14	23	4,829	11	1,155
15	22	5,260	10	1,330
16	71	11,760	11	1,791
17	18	3,404	7	1,185
18	57	11,729	3	217
19	15	3,137	1	225
20	24	5,054	3	387
21	5	700	1	125
22	3	370	5	540
23	30	5,469	6	604
24	254	53,164	99	17,459
25	9	1,937	5	515
26	19	4,221	5	718
27	28	4,290	4	340
28	14	3,305	6	844
29	38	6,325	6	527
30	315	56,094	89	12,183
31	3	1,260	2	229
32	1,164	211,778	115	18,159
33	4	1,002	.....	50
34	49	9,358	19	1,697
35	20	4,884	7	506
36	7	2,320	.....	.....
37	17	2,873	8	879
38	31	6,705	.....	.....
39	7	1,020	1	175
40	20	3,802	12	1,542
41	17	5,586	16	2,405
42	15	1,498	1	30
43	36	8,097	2	169
44	36	6,070	10	870
45	37	5,814	9	956
46	11	2,566	4	737
47	11	1,805	3	395
48	12	2,731	3	400
49	8	1,675	3	584
50	44	9,408	4	966

TABLE No. 2—
Manufactures in Iowa

Running number.	COUNTIES.	Salaried officials, clerks, etc.		AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.			
				Total.		Men, 16 years and over.	
				Average number.	Wages.	Average number.	Wages.
		Number.	Salaries.				
51	Asper.....	70	\$ 45,680	405	\$ 156,667	309	\$ 141,866
52	Jefferson.....	27	13,164	244	48,642	195	77,246
53	Johnson.....	155	72,529	747	324,109	598	297,287
54	Jones.....	17	6,663	317	111,853	255	99,429
55	Keokuk.....	18	9,391	233	95,069	203	80,973
56	Kossuth.....	17	3,723	99	46,166	87	44,012
57	Lee.....	426	533,955	2,842	1,104,748	2,266	985,368
58	Linn.....	341	289,108	3,184	1,424,523	2,605	1,295,770
59	Louisa.....	7	3,135	155	44,171	102	34,687
60	Lucas.....	8	5,049	200	73,467	167	68,392
61	Lyon.....	1	600	59	28,606	50	27,276
62	Madison.....	6	1,827	137	52,645	114	48,514
63	Mahaska.....	52	30,794	653	284,072	531	257,964
64	Marion.....	15	6,111	241	65,525	188	58,090
65	Marshall.....	116	115,946	1,715	742,979	1,570	716,099
66	Mills.....	8	4,832	145	54,338	96	40,819
67	Mitchell.....	11	4,600	130	50,667	109	47,064
68	Monona.....	2	318	52	19,030	46	18,215
69	Monroe.....	3	1,650	113	42,558	94	39,497
70	Montgomery.....	20	12,189	274	94,247	229	87,475
71	Muscatine.....	141	132,875	2,920	1,089,760	2,390	983,850
72	O'Brien.....	6	3,910	119	41,905	103	38,976
73	Osceola.....	.....	.....	37	14,869	32	14,195
74	Page.....	14	7,716	362	144,153	303	134,435
75	Palo Alto.....	20	5,356	143	57,731	118	53,385
76	Plymouth.....	33	20,075	250	109,574	229	103,733
77	Pocahontas.....	2	180	77	30,295	55	26,719
78	Polk.....	742	606,010	4,780	2,057,979	3,855	1,841,414
79	Pottawattamie.....	134	116,844	1,282	652,164	1,124	617,776
80	Poweshiek.....	34	23,807	389	166,355	316	144,163
81	Ringgold.....	2	198	48	18,436	37	16,391
82	Sac.....	4	1,146	88	36,640	75	33,562
83	Scott.....	462	457,338	4,410	1,918,593	3,392	1,682,915
84	Shelby.....	10	2,290	70	28,588	63	27,730
85	Sioux.....	12	7,070	169	67,341	143	61,962
86	Story.....	15	4,093	175	72,968	136	66,348
87	Tama.....	20	10,960	320	122,137	249	111,106
88	Taylor.....	3	410	128	19,650	103	17,714
89	Union.....	32	23,725	457	191,129	398	182,084
90	Van Buren.....	30	22,341	349	100,858	228	78,291
91	Wapello.....	211	178,538	2,150	819,579	1,766	738,632
92	Warren.....	4	1,900	106	35,232	86	32,350
93	Washington.....	10	3,910	288	105,948	258	100,777
94	Wayne.....	8	2,465	133	42,549	104	37,829
95	Webster.....	121	84,034	746	326,778	637	298,903
96	Winnebago.....	13	3,235	142	57,868	118	52,077
97	Winneshek.....	23	12,016	287	115,556	251	108,102
98	Woodbury.....	329	297,997	3,183	1,514,296	2,679	1,407,356
99	Worth.....	8	1,005	55	23,276	48	21,957
100	Wright.....	14	6,638	267	128,695	246	124,760

CONTINUED.

by Counties: 1900.

RUNNING NUMBER	AVERAGE NUMBER OF WAGE-EARNERS AND TOTAL WAGES.			
	Women, over 16 years.		Children, under 16 years	
	Average number.	Wages.	Average number.	Wages.
51	91	\$ 14,269	5	\$ 532
52	35	6,795	14	601
53	130	24,644	13	2,178
54	48	10,400	14	1,524
55	23	5,303	7	793
56	6	1,335	6	819
57	485	106,795	91	12,585
58	459	103,808	120	24,945
59	20	4,780	33	4,764
60	28	4,595	5	480
61	3	630	6	600
62	17	3,571	6	560
63	94	23,289	25	2,819
64	35	5,591	18	1,844
65	120	24,211	25	2,669
66	40	11,779	9	1,740
67	15	2,963	6	640
68	2	275	4	540
69	14	2,355	5	706
70	30	5,889	9	883
71	366	80,597	164	25,313
72	10	2,219	6	710
73	3	486	2	188
74	44	8,449	15	1,269
75	17	3,328	8	1,010
76	24	5,201	6	640
77	14	2,718	8	858
78	819	198,092	106	19,736
79	130	30,125	28	4,263
80	71	21,936	2	256
81	6	1,365	5	680
82	11	2,870	2	208
83	854	212,665	164	23,013
84	2	408	5	450
85	15	3,419	11	1,960
86	26	5,160	13	1,460
87	40	6,698	31	4,333
88	16	811	9	1,125
89	59	9,045		
90	109	21,514	12	1,053
91	232	60,405	152	20,542
92	9	1,712	11	1,170
93	24	4,258	6	913
94	21	3,885	8	835
95	98	25,890	11	1,585
96	20	5,063	4	728
97	34	7,274	2	180
98	443	97,137	61	9,803
99	6	1,139	1	180
100	13	3,133	8	802

TABLE No. 2—
Manufactures in Iowa

Running number.	COUNTIES.	MISCELLANEOUS EXPENSES.				
		Total.	Rent of works.	Taxes not including internal revenue.	Rent of offices, interest, etc.	Contract work.
1	The State....	\$ 7,988,767	\$ 1,166,879	\$ 547,635	\$ 5,592,216	\$ 682,037
2	Adair.....	9,158	2,751	771	5,528	108
3	Adams.....	10,371	2,705	755	6,851	...
4	Allamakee.....	18,266	5,235	1,854	10,862	285
5	Appanoose.....	18,019	4,576	2,544	5,669	5,250
6	Audubon.....	7,548	3,017	993	3,513	25
7	Benton.....	49,384	7,544	3,108	34,880	3,702
8	Black Hawk.....	144,504	29,097	13,384	101,737	286
9	Boone.....	33,702	15,911	4,350	13,000	435
10	Bremer.....	19,344	6,799	1,747	9,911	887
11	Buchanan.....	22,514	7,166	2,730	12,468	150
12	Buena Vista.....	13,053	4,413	1,325	7,145	179
13	Butler.....	19,070	6,411	1,944	10,565	150
14	Calhoun.....	14,029	5,271	1,732	6,776	250
15	Carroll.....	19,674	6,454	1,666	11,614	...
16	Cass.....	27,305	9,047	2,977	14,671	20
17	Cedar.....	15,591	5,197	2,136	5,298	2,968
18	Cerro Gordo.....	26,999	9,092	3,066	13,716	1,125
19	Cherokee.....	16,372	4,662	1,253	10,457	...
20	Chickasaw.....	20,483	4,667	1,791	11,186	2,839
21	Clarke.....	4,909	1,679	657	2,545	26
22	Clay.....	9,093	1,568	1,199	4,825	1,501
23	Clayton.....	25,844	7,219	2,852	15,073	700
24	Clinton.....	377,521	32,807	50,704	290,460	3,550
25	Crawford.....	11,115	3,756	1,547	5,692	120
26	Dallas.....	18,989	5,375	1,792	10,982	840
27	Davis.....	8,215	3,264	931	3,780	240
28	Decatur.....	10,044	3,012	1,089	5,793	150
29	Delaware.....	21,963	3,399	1,971	16,599	...
30	Des Moines.....	450,508	53,958	30,548	332,371	33,631
31	Dickinson.....	6,447	2,206	1,086	2,648	507
32	Dubuque.....	1,044,201	90,738	54,688	785,227	113,548
33	Emmett.....	9,908	3,477	851	4,880	700
34	Fayette.....	37,356	10,011	3,289	23,390	668
35	Floyd.....	20,976	5,868	2,352	12,226	538
36	Franklin.....	8,220	2,311	839	5,070	...
37	Fremont.....	13,768	4,563	1,739	7,266	200
38	Greene.....	10,577	4,106	1,352	4,809	310
39	Grundy.....	10,514	4,651	1,080	4,753	30
40	Guthrie.....	15,515	4,373	1,700	9,282	160
41	Hamilton.....	22,156	4,015	2,175	15,966	...
42	Hancock.....	8,149	3,126	1,174	3,832	17
43	Hardin.....	35,029	7,761	3,398	15,245	8,625
44	Harrison.....	16,413	6,233	2,564	7,576	40
45	Henry.....	24,951	10,051	2,102	11,658	1,140
46	Howard.....	13,119	4,474	1,720	6,303	622
47	Humboldt.....	9,943	2,430	1,536	5,860	117
48	Ida.....	11,143	3,435	1,605	6,028	75
49	Iowa.....	13,188	3,598	1,537	7,607	448
50	Jackson.....	48,556	7,315	3,794	33,649	3,798

CONTINUED.

by Counties: 1900.

RUNNING NUMBER.	COST OF MATERIALS USED.			Value of products, including custom work and repairing.
	Total.	Principal materials including mill supplies and freight.	Fuel and rent of power and heat.	
1	\$101,170.357	\$ 98,911.434	\$ 2,258.923	\$ 164,617.877
2	162,832	157,474	5,358	236,923
3	235,504	228,284	7,220	339,404
4	430,121	422,350	7,771	682,479
5	215,921	207,558	8,363	447,415
6	274,815	268,104	6,711	386,073
7	529,189	511,778	17,411	983,903
8	2,641,551	2,604,766	36,785	4,071,821
9	601,547	577,334	24,213	1,194,270
10	681,321	668,066	13,255	929,293
11	654,634	641,759	12,875	959,277
12	318,791	307,840	10,951	469,623
13	581,932	569,635	12,297	796,660
14	295,359	288,004	6,455	509,407
15	327,212	310,269	7,943	543,486
16	490,238	481,203	9,035	817,079
17	288,958	274,455	14,503	543,252
18	443,220	422,151	21,066	899,879
19	167,910	160,814	7,096	311,632
20	683,371	670,519	12,852	912,868
21	83,613	80,903	2,710	151,847
22	240,963	235,866	5,097	340,449
23	1,060,045	1,045,656	14,389	1,514,540
24	4,459,469	4,400,040	58,529	7,265,252
25	241,021	229,685	11,336	387,232
26	302,710	285,774	16,936	510,068
27	95,026	92,827	2,199	208,037
28	93,050	88,342	4,708	212,368
29	758,979	743,426	15,553	1,085,520
30	3,247,247	3,181,304	65,943	6,145,776
31	207,178	200,164	7,014	296,062
32	6,366,965	6,261,987	104,978	11,614,240
33	163,345	157,235	6,110	242,376
34	1,065,235	1,034,779	30,456	1,729,214
35	393,308	383,781	9,527	660,714
36	184,537	178,908	5,629	273,293
37	194,662	184,299	10,363	351,689
38	220,266	211,275	8,991	388,634
39	322,298	313,833	8,465	450,816
40	312,045	299,452	12,593	489,678
41	416,260	393,156	23,110	718,466
42	166,933	162,161	4,772	271,219
43	684,819	670,411	14,408	1,060,422
44	489,232	467,560	21,672	898,661
45	219,557	210,152	9,405	414,966
46	467,694	450,424	8,270	681,037
47	285,218	277,924	7,294	423,798
48	317,029	309,122	7,907	463,228
49	231,209	219,290	11,919	368,795
50	620,490	607,420	13,070	971,117

TABLE No. 2—
Manufactures in Iowa

Running number.	COUNTIES.	MISCELLANEOUS EXPENSES.				
		Total.	Rent of works	Taxes not including internal revenue.	Rent of offices, interest, etc.	Contract work.
51	Jasper.....	\$ 64,060	\$ 10,938	\$ 4,122	\$ 37,367	\$ 11,633
52	Jefferson.....	26,510	1,807	1,741	19,962	.....
53	Johnson.....	98,149	18,420	6,403	72,501	885
54	Jones.....	26,617	8,019	3,171	14,282	1,145
55	Keokuk.....	18,333	6,599	2,457	9,092	185
56	Kossuth.....	12,755	3,119	1,704	7,347	525
57	Lee.....	325,663	30,603	26,960	208,594	59,506
58	Linn.....	545,593	54,057	20,340	418,624	52,572
59	Louisa.....	7,178	2,364	900	3,899	15
60	Lucas.....	14,015	6,286	859	5,670	1,200
61	Lyon.....	9,435	3,462	1,277	4,384	312
62	Madison.....	17,677	5,098	936	4,183	7,460
63	Mahaska.....	72,643	19,689	4,197	35,532	13,225
64	Marion.....	18,479	4,249	2,278	11,652	300
65	Marshall.....	209,969	24,131	10,350	175,318	110
66	Mills.....	10,465	4,029	902	5,474	.....
67	Mitchell.....	12,553	3,237	1,068	8,248	.....
68	Monona.....	7,727	2,527	976	4,224	.....
69	Monroe.....	12,185	4,387	833	5,330	1,635
70	Montgomery.....	26,529	8,391	2,705	15,183	250
71	Muscataine.....	219,554	21,187	25,148	124,854	48,365
72	O'Brien.....	18,500	5,338	2,798	10,269	75
73	Oceola.....	6,166	2,026	635	2,005	1,500
74	Page.....	27,157	7,860	3,660	13,582	2,055
75	Palo Alto.....	12,434	5,101	1,154	5,978	201
76	Plymouth.....	63,320	8,046	4,312	50,385	577
77	Pocahontas.....	8,823	3,040	1,177	4,606	.....
78	Polk.....	901,105	134,902	43,650	615,442	107,111
79	Pottawattamie.....	178,344	30,216	9,674	133,910	4,544
80	Poweshiek.....	43,128	6,170	2,025	21,898	13,035
81	Ringgold.....	5,444	2,482	710	2,247	5
82	Sac.....	13,667	3,475	1,412	8,170	610
83	Scott.....	861,287	77,317	45,405	655,182	83,383
84	Shelby.....	5,610	1,671	715	3,224	.....
85	Sioux.....	34,054	4,959	2,766	26,329	.....
86	Story.....	19,329	6,022	1,807	10,477	1,023
87	Tama.....	29,141	7,295	2,418	18,639	789
88	Taylor.....	16,546	3,706	1,067	5,949	5,824
89	Union.....	34,554	13,043	5,864	13,787	1,860
90	Van Buren.....	28,311	3,268	2,939	20,198	1,906
91	Wapello.....	205,929	28,955	13,746	161,406	1,822
92	Warren.....	11,318	2,846	1,309	4,565	1,600
93	Washington.....	35,782	5,672	2,561	10,146	17,403
94	Wayne.....	10,373	4,488	1,223	4,212	450
95	Webster.....	100,082	17,839	6,453	48,436	27,354
96	Winnebago.....	14,082	3,998	1,339	8,595	150
97	Winneshiek.....	34,247	8,278	3,271	21,654	1,044
98	Woodbury.....	670,166	75,067	26,695	552,999	15,415
99	Worth.....	6,828	1,742	1,187	2,844	1,055
100	Wright.....	13,289	5,004	2,179	6,106	.....

CONTINUED.

by Counties: 1900.

RUNNING NUMBER.	COST OF MATERIAL USED.			Value of products including custom work and repairing.
	Total.	Principal materials including mill supplies and freight.	Fuel and rent of power and heat.	
51	\$ 430,250	\$ 416,653	\$ 13,597	\$ 990,950
52	297,453	281,654	15,799	549,829
53	865,459	847,830	17,629	1,675,860
54	780,735	762,895	17,840	1,120,538
55	200,050	277,941	12,109	583,695
56	465,582	454,297	11,285	606,940
57	3,096,156	3,020,399	75,757	5,207,571
58	9,513,605	9,399,815	113,790	13,632,423
59	152,820	148,131	4,689	298,390
60	181,466	176,836	4,630	377,501
61	306,244	300,069	5,275	446,012
62	112,739	109,869	2,870	258,364
63	566,120	546,837	19,283	1,108,227
64	244,775	237,579	7,196	460,551
65	3,392,079	3,205,085	126,994	5,086,205
66	152,116	146,151	5,965	305,628
67	490,716	483,800	6,916	661,201
68	94,019	89,607	4,412	188,098
69	169,141	165,789	3,352	278,737
70	374,623	362,771	11,852	668,017
71	3,913,909	3,879,544	34,365	6,038,823
72	503,540	488,220	15,320	686,414
73	66,333	63,828	2,505	121,024
74	454,667	437,760	16,907	812,979
75	469,881	459,310	10,571	675,673
76	473,352	453,393	19,959	1,223,241
77	184,000	176,392	7,608	300,711
78	5,173,612	4,996,193	177,419	10,856,986
79	1,491,763	1,444,871	46,892	3,029,528
80	537,308	527,953	9,355	1,192,863
81	80,682	77,384	3,298	169,495
82	341,303	332,061	9,242	509,404
83	6,921,917	6,722,617	199,300	11,720,441
84	179,436	171,271	8,165	289,954
85	501,776	487,806	13,970	778,244
86	401,652	389,124	12,528	666,552
87	329,798	309,074	20,724	662,929
88	227,212	220,454	6,758	376,153
89	469,511	458,164	11,347	879,288
90	424,728	415,800	8,928	717,314
91	7,169,468	7,110,906	58,562	9,281,773
92	240,496	235,654	4,842	384,588
93	368,528	356,573	11,955	666,501
94	179,421	172,571	6,850	310,707
95	1,041,381	978,699	62,752	1,813,400
96	418,685	409,153	9,532	589,652
97	779,112	765,566	13,546	1,177,067
98	10,862,993	10,694,451	168,542	15,801,189
99	262,704	256,041	6,663	353,300
100	370,206	356,441	13,765	621,568

IOWA.

TABLE No. 3—Comparative summary 1850, to 1900, with per cent of increase for each decade.

	DATE OF CENSUS.					PER CENT OF INCREASE.				
	1900.	1890.	1880.	1870.	1860.	1850.	1890. to 1900.	1880. to 1890.	1870. to 1880.	1860. to 1870.
Number of establishments.....	14,819	7,440	6,081	6,556	1,939	522	99.2	7.5	5.4	238.6
Capital.....	\$102,733,103	\$77,513,697	\$33,984,886	\$22,420,183	\$7,247,136	\$1,292,875	32.5	126.1	51.6	289.4
Salaries of officials, clerks, etc.....	\$5,064	\$8,137	+	+	+	+	17.7	...	...	...
Salaries.....	\$4,486,117	\$5,449,377	28,372	25,032	6,307	1,707	14.7	79.9	13.3	289.9
Wage earners, average number.....	58,583	51,037	9,725,982	\$6,693,292	\$1,924,417	473,016	17.1	110.5	41.1	288.6
Total wages.....	\$23,931,680	\$20,429,020	23,382	23,395	6,162	1,687	9.8	74.2	8.5	286.9
Men, 16 years and over.....	48,417	44,210	1,431	951	105	20	59.1	262.2	50.5	476.4
Wages.....	\$21,893,983	\$19,232,185	1,431	951	105	20	59.1	262.2	50.5	476.4
Women, 16 years and over.....	8,248	5,183	1,431	951	105	20	59.1	262.2	50.5	476.4
Wages.....	\$1,704,766	\$999,806	1,431	951	105	20	59.1	262.2	50.5	476.4
Children, under 16 years.....	1,888	1,644	1,559	886	...	...	14.8	5.4	127.3	...
Wages.....	\$22,911	\$197,159	8	8	8	8	38.4	...	...	...
Miscellaneous expenses.....	\$7,968,707	\$5,732,266	8	8	8	8	39.4	...	...	...
Cost of materials used.....	101,170,357	79,292,407	48,704,311	27,682,096	8,612,259	2,350,881	27.6	62.8	75.9	221.4
Value of products, including custom work and repairing.....	164,617,877	125,049,183	71,045,926	46,534,322	13,971,395	3,551,783	31.6	76.0	52.7	123.1
Total population.....	2,331,853	1,911,866	1,624,615	1,194,020	674,913	102,214	16.7	17.7	36.1	76.9
Wage-earners engaged in manufactures.....	58,553	51,037	28,372	25,032	6,307	1,707	14.7	79.9	13.3	289.9
Per cent of total population.....	2.6	2.7	1.7	2.1	0.9	0.9	...	...	...	...
Assessed value of real estate.....	\$440,769,952	\$370,921,446	\$297,254,342	\$226,610,638	\$149,433,423	\$15,672,332	18.8	24.8	31.2	51.6
Value of land and buildings invested in manufactures.....	30,255,521	21,607,899	...	...	...	...	39.4	...	...	...
Percent of assessed value.....	6.9	5.9	...	...	...	...	...	...	...	...

* Includes proprietors and firm members, with their salaries, number only reported in 1900. See table 5.

† Not reported separately.

‡ Decrease.

§ Net reported.

|| As given for the year 1900 in Dana's supplement "State and City" to the *Commercial and Financial Chronicle* under date of April 13, 1901.

¶ Does not include value of rented property.

IOWA.

TABLE NO. 4.—Summary for all Establishments.

CLASSES.	Number of establishments.	Capital.	WAGE-EARNERS.			COST OF MATERIALS USED.					Value of products, including custom work and repairing.
			Proprietors and firm members.	Average number.	Total wages.	Miscellaneous expenses.	Total.	Purchased in raw state.	Purchased in partially manufactured form.	Fuel, freight, etc.	
Total.....	18,490	\$104,343,592	20,571	59,367	\$23,988,057	\$ 8,083,729	\$101,667,061	\$ 53,240,444	\$ 44,560,901	\$3,865,716	\$ 105,776,791
Hand trades*.....	6,924	\$ 8,722,661	8,051	11,088	\$ 4,631,330	\$ 1,269,740	\$ 9,931,978	\$ 120,423	\$ 9,429,121	\$ 382,434	\$ 22,166,774
Educational, eleemosynary and penal institutions.....	21	169,690	104	55	18,476	11,671	194,741	12,898	170,639	11,204	261,344
Establishments with a product of less than \$500.....	3,589	1,440,799	3,818	759	37,991	83,291	301,963	28,734	271,430	1,799	897,570
All other establishments.....	7,895	94,010,442	8,568	47,465	\$19,300,350	\$ 6,719,027	\$1,238,379	\$3,078,389	\$4,689,711	\$ 3,470,279	\$142,451,103

*Bicycle and tricycle repairing, 130; blacksmithing and wheelwrighting, 2,468; boots and shoes, custom work and repairing, 475; carpentering, 720; clothing, mens, custom work and repairing, 500; clothing, womens, dressmaking, 291; dyeing and cleaning, 201; furniture, cabinet making, repairing and upholstering, 103; lock and gunsmithing, 41; masonry, stucco works, 58; plumbing and gas and steam fitting, 190; sewing machine repairing, 6; typewriter repairing, 1; watch clock and jewelry repairing, 482.

1 DLS.—77 establishments with a capital of \$1,293,220

IOWA.

TABLE NO. 5.—Comparative summary of ten leading industries.

INDUSTRIES.	Year.	Number of establishments.	Capital.	WAGE-EARNERS.		Miscellaneous expense.	Cost of materials used.	Value of products including custom work and repairing.
				Average Number.	Total wages.			
Total for selected industries for state.	1900	3,763	\$ 48,008,670	21,611	\$8,883,651	\$ 2,814,002	\$ 64,303,185	\$89,703,303
Increase 1890 to 1900.	1890	2,572	46,407,079	24,955	9,508,768	2,915,253	53,865,894	75,276,082
Per cent of increase.		1,191	1,601,591	3,344	625,117	101,251	10,417,365	14,425,221
Per cent of total of all industries in state.	1900	46.3	3.5	13.4	8.6	3.5	10.4	9.2
	1890	25.4	40.7	30.9	37.1	35.2	68.5	54.5
	1890	34.6	59.9	48.9	49.5	50.9	68.0	60.2
Carriages and wagons.	1900	211	\$ 4,087,400	1,692	\$ 713,901	\$ 243,794	\$ 1,863,988	\$ 3,931,067
	1890	204	2,765,207	1,602	769,923	142,236	1,449,922	3,108,545
Cheese, butter and condensed milk factory product.	1900	907	3,459,017	1,133	588,653	153,990	13,501,556	15,846,077
	1890	497	2,074,177	2,355	944,895	121,160	8,360,689	10,545,182
CLAY PRODUCTS:								
Total	1900	356	3,437,613	2,220	862,159	140,459	517,580	2,224,040
	1890	289	2,114,869	2,788	724,099	108,934	332,393	1,775,165
Brick and tile.	1900	339	3,076,355	1,986	768,860	115,897	400,313	1,976,323
	1890	260	1,802,942	2,543	628,588	84,811	282,431	1,537,860
Pottery, terra cotta and fire clay products.	1900	17	361,258	234	93,299	24,562	57,207	248,597
	1890	29	311,021	245	96,411	24,123	49,202	237,275
Flouring and grist mill products.	1900	702	6,421,078	1,285	526,479	304,256	9,786,174	13,823,083
	1890	441	6,666,759	1,248	507,414	363,993	11,272,217	11,833,737
Food preparations.	1900	16	2,501,521	609	209,031	196,297	2,368,003	3,004,031
	1890	8	579,866	147	59,364	35,700	766,739	900,811
Foundry and machine shop products.	1900	190	3,724,774	2,372	1,088,312	200,918	2,189,660	4,460,914
	1890	126	3,032,277	2,142	1,066,715	179,788	1,454,164	3,432,360
Lumber and timber products.	1900	264	8,762,219	2,793	1,046,181	344,386	6,324,034	8,677,058
	1890	143	17,530,335	6,819	2,101,648	639,890	7,060,266	12,056,302
Lumber planing mill products, including sash, doors and blinds.	1900	65	3,576,305	2,372	683,924	235,979	3,195,243	5,295,546
	1890	46	3,044,145	1,983	825,435	182,242	2,062,125	3,508,856
PRINTING AND PUBLISHING:								
Total	1900	1,025	5,670,390	4,248	1,656,844	533,937	1,494,260	6,145,593
	1890	699	4,084,430	3,206	1,385,686	621,545	1,118,105	4,551,548
Book and job.	1900	115	976,341	855	345,665	89,247	411,711	1,210,110
	1890	56	582,780	442	182,495	74,085	284,341	732,925
Newspapers and periodicals.	1900	910	4,703,049	3,393	1,317,179	444,690	1,082,549	4,032,453
	1890	643	3,501,710	2,854	1,203,185	547,460	863,764	3,818,623

IOWA.

TABLE NO. 6.—Urban Manufactures.

	Number of establishments.	CAPITAL.	Proprietors and firm members.	WAGE-EARNERS.		Miscellaneous expenses.	Cost of materials used.	Value of products including custom work and repairing.
				Average number.	Total wages.			
Total for state.....	14,819	\$102,733,103	16,619	58,553	\$ 23,931,680	\$ 7,938,797	\$101,170,357	\$164,565,377
Total for Urban manufactures.....	5,408	\$ 77,012,586	6,011	44,457	\$ 18,436,261	\$ 6,453,682	\$ 71,820,352	\$118,419,009
Belle Plaine.....	41	\$ 80,742	55	134	\$ 58,328	\$ 8,819	\$ 122,413	\$ 232,581
Boone.....	114	400,260	146	670	315,813	28,725	471,794	975,545
Burlington.....	340	5,235,624	358	2,597	1,013,098	414,819	2,809,536	5,334,106
Cedar Falls.....	67	658,605	75	315	123,000	55,386	678,000	1,040,557
Cedar Rapids.....	241	6,256,801	281	3,105	1,313,821	518,455	8,069,992	12,715,897
Centerville.....	54	173,910	59	203	82,667	14,685	168,272	341,160
Chariton.....	46	126,090	52	175	64,837	12,068	155,346	323,000
Charles City.....	61	288,313	73	185	77,479	15,021	231,864	433,085
Clarinda.....	44	126,706	57	84	33,449	9,434	97,158	179,096
Council Bluffs.....	224	4,537,408	268	3,080	1,137,019	370,141	4,247,957	6,039,473
Cresco.....	108	1,176,408	213	1,179	609,995	160,871	1,224,814	2,596,830
Decorah.....	103	335,030	69	106	34,910	7,554	168,183	204,772
Davenport.....	416	10,774,707	456	4,348	1,892,737	29,743	6,854,677	11,573,670
Decorah.....	85	318,540	97	173	75,619	855,397	221,213	443,345
Des Moines.....	494	7,911,764	515	4,557	1,942,599	894,601	4,975,568	10,438,686
Dubuque.....	460	8,117,358	526	5,503	2,012,153	1,028,245	5,930,017	10,952,304
Fort Dodge.....	88	903,834	88	527	224,124	38,242	703,266	1,263,395
Fort Madison.....	83	1,546,574	75	965	409,351	95,455	870,482	1,737,254
Grimell.....	81	812,940	102	334	145,664	37,045	1,004,642	1,004,642
Independence.....	57	312,405	56	150	57,375	14,768	163,201	314,179
Iowa City.....	120	1,003,099	136	660	299,084	89,077	781,786	1,511,065
Keokuk.....	188	2,103,335	197	1,683	614,586	100,578	1,882,227	3,660,047
LeMars.....	69	555,622	73	190	85,816	52,658	1,600,859	3,956,686
Mason City.....	80	351,868	103	376	167,211	21,013	330,110	705,460
Marion.....	55	113,970	69	78	35,666	9,627	117,978	244,545
Marshalltown.....	147	5,866,270	170	1,399	654,227	190,554	3,180,658	4,587,240
Muscatine.....	247	3,725,971	205	2,835	1,051,904	212,793	3,773,379	5,791,110
Newton.....	46	121,133	106	311	121,831	44,768	244,402	5,666,787
Osceola.....	37	614,599	41	511	279,022	10,081	337,160	674,617

Utah.....	15	84,990	145	197	29,846	61,795	120,174	202,494
Vermont.....	145	55,321	188	197	29,846	61,795	120,174	202,494
Virginia.....	160	3,403,331	188	2,004	29,846	61,795	120,174	202,494
Washington.....	56	210,623	188	2,004	29,846	61,795	120,174	202,494
West Virginia.....	160	5,691,644	188	2,004	29,846	61,795	120,174	202,494
Wisconsin.....	160	1,287,656	188	2,004	29,846	61,795	120,174	202,494
Wyoming.....	145	138,455	188	2,004	29,846	61,795	120,174	202,494
Yukon.....	33	138,455	188	2,004	29,846	61,795	120,174	202,494
Whitcheer.....	41	138,455	188	2,004	29,846	61,795	120,174	202,494
Total for state exclusive of Urban manufactures	9,411	\$ 25,720,517	10,608	14,096	\$ 5,495,419	\$ 1,535,088	\$ 29,850,005	\$ 46,146,364
Percent of urban manufactures to total for state..	36.5	75.0	36.2	75.9	77.0	86.8	71.0	72.0

BULLETIN OF MANUFACTURERS.

The following is a summary of the manufacturing industries of the state of Iowa and the cities of Burlington, Cedar Rapids, Clinton, Council Bluffs, Davenport, Des Moines, Dubuque and Sioux City in that State, according to the official returns of the twelfth census :

IOWA.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	14,819	7,440	99.2
Capital	\$102,733,103	\$ 77,513,097	32.5
Wage-earners, average number ..	58,553	51,037	14.7
Total wages	\$ 23,931,680	\$ 20,429,620	17.1
Miscellaneous expenses	7,988,767	5,732,206	39.4
Cost of materials used	101,170,357	79,292,407	27.6
Value of products, including custom work and repairing.....	164,617,877	125,049,183	31.6

BURLINGTON.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	340	223	52.5
Capital	\$ 5,235,624	\$ 3,963,986	32.1
Wage-earners, average number ..	2,597	2,935	*11.5
Total wages	\$ 1,013,998	\$ 1,157,414	*12.4
Miscellaneous expenses	414,819	259,615	59.8
Cost of materials used	2,809,536	3,099,200	*9.3
Value of products, including custom work and repairing.....	5,334,195	5 413,138	*1.5

*Decrease.

CEDAR RAPIDS.

	1900.	*1890.	Per Cent. of Increase.
Number of establishments.....	241	.....	.....
Capital.....	\$ 6,256,801	.....	.....
Wage-earners, average number..	3,105	.....	.....
Total wages.....	\$ 1,313,821	.....	.....
Miscellaneous expenses.....	518,455	.....	.....
Cost of materials used.....	8,969,992	.....	.....
Value of products, including custom work and repairing.....	12,715,897	.....	.....

*Not separately reported at the census of 1890.

CLINTON.

	1900.	*1890.	Per Cent. of Increase.
Number of establishments.....	224	.....	.....
Capital.....	\$ 4,527,200	.....	.....
Wage-earners, average number..	3,080	.....	.....
Total wages.....	\$ 1,137,019	.....	.....
Miscellaneous expenses.....	370,141	.....	.....
Cost of materials used.....	4,247,057	.....	.....
Value of products, including custom work and repairing.....	6,939,473	.....	.....

*Not separately reported at the census of 1890.

COUNCIL BLUFFS.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	198	128	54.7
Capital.....	\$ 1,176,408	\$ 1,292,283	*9.0
Wage-earners, average number..	1,179	1,469	*17.7
Total wages.....	\$ 609,905	\$ 701,723	*13.1
Miscellaneous expenses.....	150,871	92,886	73.2
Cost of materials used.....	1,224,814	1,272,946	*3.8
Value of products, including custom work and repairing.....	2,596,830	2,527,388	2.7

*Decrease.

. DAVENPORT.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	416	475	*12.4
Capital.....	\$ 10,774,707	\$ 8,732,122	23.4
Wage-earners, average number...	4,348	4,461	*2.5
Total wages.....	\$ 1,892,737	\$ 1,640,495	15.4
Miscellaneous expenses.....	855,397	780,201	9.6
Cost of materials used.....	6,854,677	6,098,349	12.4
Value of products, including custom work and repairing.....	11,573,670	10,357,232	11.7

*Decrease.

DES MOINES.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	494	330	49.7
Capital.....	\$ 7,911,764	\$ 3,877,140	104.1
Wage-earners, average number ..	4,557	3,420	33.2
Total wages.....	\$ 1,942,509	\$ 1,631,107	19.1
Miscellaneous expenses.....	894,691	442,162	102.3
Cost of materials used.....	4,975,568	4,408,377	12.9
Value of products, including custom work and repairing.....	10,453,189	7,931,272	32.2

DUBUQUE.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	460	262	75.6
Capital.....	\$ 8,117,358	\$ 7,016,802	15.7
Wage-earners, average number ..	5,508	4,198	31.1
Total wages.....	\$ 2,012,153	\$ 1,715,876	17.3
Miscellaneous expenses.....	1,028,245	566,377	82.2
Cost of materials used.....	5,930,017	5,984,431	*1.0
Value of products, including custom work and repairing.....	10,952,204.	9,894,860	10.7

*Decrease.

SIOUX CITY.

	1900.	1890.	Per Cent. of Increase.
Number of establishments.....	329	196	67.9
Capital	\$ 5,691,644	\$ 5,222,626	9.0
Wage-earners	3,104	2,629	18.1
Total wages	\$ 1,485,066	\$ 1,520,576	*2.3
Miscellaneous expenses.....	664,486	494,489	34.4
Cost of materials used	10,669,672	10,295,190	3.6
Value of products, including cus- tom work and repairing.....	15,469,702	14,119,843	9.6

*Decrease.



WAGE EARNERS OF IOWA.



WAGE EARNERS STATISTICS.

This inquiry into the condition of the wage earners of the state as required by section 2470, was made largely through the medium of the mails and also through personal solicitation.

The inquiry was of an exhaustive character and intended to cover every branch of industrial activity, or at least give an opportunity to the varied sub-divisions of laborers to report as the questions applied to their class of employment. While the returns in general are replete with a fund of unsurpassed information in this direction, yet it has been found that many of the returns were confusing and worthless and it is suggested that in future any researches of this character could be more profitably undertaken if separate schedules were framed to suit that distinct trade or craft, and they would then, it is believed, meet with a more general response.

Copy of letter and blank with which the investigation was made, is as follows:

WAGE-EARNERS OF IOWA.

INDIVIDUAL STATEMENT.

STATE OF IOWA,

BUREAU OF LABOR STATISTICS,

DES MOINES, IOWA,

DEAR SIR—The Commissioner of the Bureau of Labor Statistics of Iowa is authorized by law (chapter 8, section No. 2470, revised code of 1897), to collect individual statements from the wage-earners of the state, and the law requires that in his "biennial report he shall give a statement of the business of the bureau since the last regular report, and shall compile and publish therein such information as may be considered of value to the industrial interests of the state, the number of laborers and mechanics employed, the number of apprentices in each trade, with the nativity of such laborers, mechanics' and apprentices' wages earned, the savings from the same; with age and sex of laborers employed, the number and character of accidents, the sanitary condition of institutions where labor is employed, the restrictions, if any, which are put upon apprentices when indentured, the proportion of married laborers and mechanics who live in rented houses, with the average annual rental and the value of property owned by laborers and mechanics; and he shall include in such report what progress has been made

with schools now in operation for the instruction of students in the mechanic arts and what systems have been found most practical, with details thereof,"

Please fill out as completely as possible, as it applies to your case. The facts you give will be published in report of 1899 and 1900. Your name will not be mentioned without your express authority.

Yours truly,

C. F. WENNERSTRUM,

Commissioner.

FORM OF WAGE EARNER'S BLANK.

NATIVITY.

1. Name P. O. Address
- Age Male Female
2. Married Single Where born, county
- State Foreign country

EMPLOYMENT, EARNINGS AND INCOME.

3. What is your present occupation?
4. What is your trade or profession?
5. If not employed at it now state in full
6. How many situations did you have in 1899?
7. Reasons for changing?
8. How many days were you idle in 1899? Reasons
9. Compared with 1896, have your wages increased? Or decreased?
- Compared with 1898, have your wages increased? Or decreased?
10. What per cent?
11. What wages did you receive in 1899? Per hour; per week; per month; per ton; per mile; for piecework; (Only fill out space upon which your wage-rate is based.)
Where work was done by piece, ton or mile, what were your average earnings per day? \$
12. Total wages received for your labor during 1899? \$
Income from other sources exclusive of your own wages for 1899 (garden, rent, pension and wages of other members of your family, etc.), \$; grand total income from all sources, including wages for 1899, \$
13. On what railroad system are you employed?
14. What is the length of the regular division over which you run?
15. What is the average number of miles you made per month during 1899?
16. Are you working under the demerit system or the time-losing system for offenses?
- Which do you prefer? Why?
17. What is the length of your work day?
- If 8 hours, how was it established?
- Do you favor a universal 8-hour day? How could it be obtained?
18. Do you get an extra rate of pay for overtime?
- Rate per hour for overtime?
19. Do you work 5 Sundays? Could your business be run without Sunday work? State why or why not

ORGANIZATION.

20. Is there a trade union of your craft?..... Are you a member?.....
Why or why not?.....
21. Are your employers organized in what is called a trust?..... Under
what name?..... Have you benefitted in
consequence?..... Have you suffered?..... How?.....
Do you have steadier employment?.....
22. Are you free to act and express yourself in favor of organization with-
out fear of losing your employment?.....
Do they recognize your union committees?.....
What has your union asked for?.....
Results?.....

MACHINERY.

23. Has labor saving machinery entered your business?.....
Has it thrown any persons out of employment?.....
Has it helped you?..... Or injured you?.....
Does your craft control the machine by rules and regulations?.....
To what extent?.....
24. How should the machine in your shop be controlled in the interest of
the laborer?.....
Does the operation of the machine improve your interest as a wage-
earner or does it injure it?.....
25. How many accidents from machinery occurred to persons operating
them in your shop in 1899?.....
How could they have been prevented?.....

APPRENTICES.

26. In your trade does the apprentice system still exist?.....
If so, are they legally or verbally indentured?.....
What regulations govern their number in your trade?.....
What restrictions are placed upon them individually?.....
Does an apprentice have the opportunity to learn the trade thoroughly
under your rules?.....

FEMALE AND CHILD LABOR.

27. In your trade do you compete with female or child labor?.....
Which?..... To what extent?.....
Do females perform as much labor and receive as much pay as males?
Are the females organized?.....
Name organization.....

SAFETY AND SANITATION.

28. Is your employment dangerous?..... Or unhealthful?.....
If so, how?.....
How could it be improved by legislation?.....
Are your sanitary surroundings healthful?.....
Are separate water closets provided for both sexes?.....

EDUCATION.

29. If head of family, how many children have you of school age?.....
 Males?.....Females.....How many attend school?—
 Male.....Female.....If not attending, why?.....
 What schools in your locality instruct in the use of tools?.....
 What systems have been found most practical?.....

EXPENSE, INSURANCE AND SAVINGS.

30. How many persons depend on you for support?.....Cost of living for yourself and those dependent on you for year 1899: Food \$....., fuel, \$....., clothing, \$....., sickness, \$....., rent, \$....., total, \$.....
31. As compared with 1896, has the cost of your living increased?.....or decreased?.....If so, to what do you attribute the cause?.....
 As compared with 1898, has the cost of your living increased?.....or decreased?.....
32. How much insurance do you carry?
- | | AMOUNT CARRIED. | ANNUAL COST. |
|------------------------------------|-----------------|--------------|
| Old line life, | \$..... | \$..... |
| Fraternal life, | | |
| Accident, | | |
| Fire on home, | | |
| Fire on household goods, | | |
33. Do you own a home?.....If so, what is its value? \$.....Is it all paid for?.....If mortgaged, in what amount? \$.....
 Total amount for taxes and repairs during 1899? \$.....Amount paid for interest during 1899 \$.....
34. If you live in a rented house, what rent do you pay per month? \$.....
35. Total amount paid out during 1899 for incidentals, such as books, pleasures, church support, etc., other than specified above, \$.....
36. Total amount of cash savings for 1899, \$.....

MISCELLANEOUS.

37. Does convict labor compete with you?.....How should the convict be employed so as to pay for his maintenance and reformation and not conflict with the wage-earners' interests?.....
38. What specific legislation would benefit you as a wage-earner at your present employment?.....

GENERAL REMARKS.

39.
 Date

NOTE.—The value of these statistics depends upon the accuracy with which you answer questions pertaining to your condition.

The questions under head of organization and machinery were put with the idea of gaining valuable information, and in response

to requests to investigate the effect of such powerful agencies, the replies do not justify explanation as to the information obtained.

The question of apprentices, although required to be investigated, by section 2470 has been found to be almost an extinct institution; very few trades give it any consideration, and those that do conform to no legal provisions. Bricklayers, plumbers, cigar makers, machinists, printers, and a few other highly organized trades have provisions in their agreements with employers as to the number of apprentices to the shop, and the proportion of apprentices to a specified number of journeymen in such shops, which varies in different crafts, and in some cases provisions are made that such apprentices shall be given an opportunity to learn every specific division of such trade, but beyond that the system has become almost obsolete.

Accidents, safety, sanitation, female and child labor, is treated under Factory Inspection, chapter I.

Education and manual training is confined to a separate chapter; cost of living is not tabulated, as but few families keep accounts of these important items, most of those who replied stated that it took all they could earn to live.

The wage earners' statistical table, as compiled, embraces hours worked per day, and wages received, showing the average of such trades, in the several localities, with foot notes giving detailed information.

Following the table answers to questions on convict labor and desired legislation, with special remarks, are respectfully submitted by the wage earners for the consideration of the general assembly.

ANSWERS TO QUESTIONS BY WAGE EARNERS.

What specific legislation would benefit you? and remarks.

2. BAKER—Eight-hour work day. Abolition of Sunday work.
3. BARBER—Need laws to regulate and license the barbers in state.
4. BARBER—The barbers intend to introduce another barber bill to regulate the profession.
5. BARBER—Abolish the barber colleges and give us a good barber license law.
6. BARBER—The legislature should pass a law to compel all barbers to pass a satisfactory examination and be licensed before practicing the barbers' profession.
8. BARBER—The passage by legislature of a bill requiring barbers to pass an examination and secure a state license before practicing the profession.
10. BARBER—Enact a law requiring all barbers to take an examination and secure a license before working at the barber trade.

11. **BARBER**—Give us a barber bill.
12. **BAKER**—Give us a law which will abolish Sunday work.
13. **BARTENDER**—Legalize the business and remove the many restrictions.
14. **BARBER**—License the barbers.
15. **BLACKSMITH**—Government owned railroads would give me all I produce.
16. **BLACKSMITH**—Suction fans to carry off dust and ventilators to carry off gas and smoke should be compulsory by law.
17. **BLACKSMITH**—An eight-hour law.
19. **BLACKSMITH**—Have factories inspected and abuses corrected.
22. **BOOKBINDER**—Have shops kept in sanitary condition by inspectors.
25. **BOOKKEEPER**—Give me as a wage earner the opportunity to vote on all laws under the direct legislative system, especially elect United States senators by direct vote.
26. **BOOKKEEPER**—Direct legislation would benefit all.
27. **BOOKKEEPER**—Have the union label put on all school books.
28. **BOOKKEEPER**—Factory inspection, with power to correct evils.
29. **BOOKKEEPER**—Authorize factory inspection, especially on sanitary conditions.
31. **BOILERMAKER**—Provide a law to issue inquiries like this once a year to every voter. Make it a misdemeanor if not filled out and returned.
32. **BOILERMAKER**—A state boiler inspector should be appointed and an eight-hour law established.
33. **BOILERMAKER**—Direct legislation and strict factory inspection.
34. **—BRAKEMAN**—Legislation to compel railroad companies to equip every car with air brakes, then if train separates the cars would be automatically stopped and danger to brakemen would be reduced.
36. **BRAKEMAN**—Legislation forbidding the use of two locomotives coupled to same train; and a law restricting the number of cars in train to a given number of brakemen.
37. **BRAKEMAN**—Compulsory arbitration. Abolish double headers. Strict enforcement of law forbidding the running of light engines over roads without pilots. (What law?)
38. **BRICKLAYER**—Enactment of an eight-hour law.
39. **BRICKLAYER**—Enactment of an eight-hour law; compelling contractors to work their employees only eight hours a day on all state work and supplies for state.
40. **BRICKLAYER**—Compulsory education. Restriction of child labor and young women in factories to the exclusion of men who are often compelled to be idle while the children support the fathers.
43. **BROOM MAKER**—Factory inspection is what we want.
44. **BROOM MAKER**—Compulsory education and prevent child labor until they are fourteen years of age.
45. **BROOM MAKER**—Child labor laws are needed in Iowa.
46. **BUTTON WORKER**—Stop convicts cutting button blanks for contractors.

48. **BUTTON CUTTER**—Direct legislation, factory inspection and government control of public utilities.

49. **BUTTON CUTTER**—Legislation is desirable against the contract system of convict labor at Fort Madison. Cooperative industries should be encouraged.

50. **BUTTON CUTTER**—An eight-hour law and factory inspection to regulate child labor and sanitary conditions.

51. **CARPENTER**—A state eight-hour law and a labor commissioner with authority.

53. **CARPENTER**—Harmonize society by means of public ownership.

54. **CARPENTER**—Abolish the convict contract labor system; establish an eight-hour day for state work.

55. **CARPENTER**—Enact a law so that wages will become a first lien.

59. **CARPENTER**—Labor commissioner with authority to keep children out of factories.

61. **CARRIAGE MAKER**—Regulation of child labor in factories by factory inspector.

65. **CIGAR PACKER**—Child labor regulation.

66. **CIGAR MAKER**—Enactment and enforcement of child labor laws.

67. **CIGAR MAKER**—Child labor laws and factory inspection is most needed.

72. **CIGAR MAKER**—Child labor laws are needed by cigar makers.

76. **CLERK, RETAIL**—Legislation against child labor; close all stores on the Sabbath and legal holidays by enactment.

77. **CLERK, RETAIL**—Compulsory Sunday closing of all business houses, including drug stores, cigar shops, fruit stands, barber shops, pawn shops, and make the Sabbath a day of rest.

80. **CLERK, SHIPPING**—Lower the legal rate of interest in the state.

81. **CLERK, RETAIL**—Keep all children in school until they have sufficient education to *demand* living wages. If fewer children were employed and more fathers, poverty would not stare so many in the face.

83. **CLERK, RETAIL**—Compulsory education of all children, and prohibit their employment under fifteen years of age by authority of Labor Commissioner.

86. **CLERK, JEWELRY**—An eight-hour state law, and a good Sunday closing law.

87. **CLERK, RETAIL**—Enforcement of law relative to seats for women clerks. Enactment and enforcement of laws for Sunday observance. Prohibition of child labor and compulsory closing of stores and factories on legal holidays.

88. **CLERK, RETAIL**—An eight-hour state law, and prohibition of Sunday work.

93. **CONDUCTOR, R. R.**—Shorter hours for railroad men; abolition of double headers or two locomotives coupled on one train.

94. **CONDUCTOR, R. R.**—An eight-hour day for railroad men. Limit freight trains to fifty cars, and allow three brakemen and conductor on all trains with over forty cars.

95. **CONDUCTOR, R. R.**—A law is required, allowing railroad men to work only twelve consecutive hours, as a maximum, and then permit them to have eight hours rest before resuming work.

97. CONDUCTOR, R. R.—Direct legislation.

98. CONDUCTOR, R. R.—Stop double header trains, and enact a law so that eight hours shall be the maximum schedule for a man to be on the road, and then have twelve hours off before going back to work.

99. COOPER—Prohibit formation of trusts and combines and make eight hours a maximum work day. Compel employers to provide well ventilated shops.

100. COOPERS—Compulsory education, and prohibition of child labor.

101. COOPER—Compulsory education and enforce it to the letter, so that heads of families may have opportunities to be the bread winners.

103. ELECTRICIAN—Enact laws for safe insulation of electric wires and provide for their inspection.

105. ELECTRICIAN—Intelligent inspection of all electrical construction is required for the sake of safety.

106. ELECTRICIAN—State examination and certificate granted to electricians, and strict observance of electrical laws. This inquiry is a "capital idea."

107. ELECTROTYPY—An eight hour law is the first essential.

109. ENGINEER—Abolish double headers.

110. ENGINEER—Election of United States senators by popular vote, and compulsory returns of all wage earners on blanks like this annually.

111. ENGINEER—Enact laws making it a criminal offense for the employer to keep employes on continuous duty too long without food or sleep. A practical locomotive engineer should be appointed to inspect engines and appliances, and investigate conditions under which locomotive engineers have to work.

112. ENGINEER—Government ownership of Railroads and Telegraphs.

113. ENGINEER—The labor commissioner should be given power to enforce all labor laws. We want the abolition of light engines being run over the road backwards, without rear-pilots and rear-lights, especially at night. It is very dangerous. All light engines should carry an extra man as pilot for safety.

114. ENGINEER—All labor laws are inoperative unless labor commissioner is given power to enforce them. Enact laws providing extra man for pilot on light engines, and stop running light engines backwards without head-lights.

116. ENGINEER—Make the maximum days labor for engine men twelve out of every twenty-four hours. A man working twenty to forty consecutive hours is in no physical condition to care for the public interest, he may stand it for awhile but accidents will certainly happen under such strain.

117. ENGINEER—A railway company should be compelled by law to care for an employe and family after he becomes disabled while on duty. Sunday labor should be stopped and eight hours rest assured out of every twenty-four.

118. ENGINEER—Stop double headers and running engines backward. This is the best move yet by the commissioner of labor.

119. ENGINEER—All engineers should pass a state examination and secure a license.

121. ENGINEER—A strict state license law for all engineers.

123. FIREMAN—Double headers should be stopped by law.
124. FIREMAN—Labor legislation is loaded with amendments so that it means nothing.
125. FIREMAN—Prohibit double heading of locomotives on trains and put two firemen on the very large engines.
126. FIREMEN—Legislation is needed to regulate the hours of railroad men, the length of divisions, and to prohibit the running of light engines backwards without pilots.
128. FIREMEN—One of the greatest dangers a fireman is exposed to is running light engines backwards without pilots, which could be helped by legislation.
132. FIREMAN—(Stationary)—Any legislation that will investigate our condition and produce beneficial results, from long hours, Sunday work, low wages, and insufficient ventilation.
133. } HARNESSMAKERS—A universal eight hour law is the first thing
134. }
135. } needful.
138. HORSESHOER—A horseshoer should have a state certificate of competency and then be personally responsible for his work. All shoeing done on a horse should be a perpetual lien until paid.
140. LABORER—All assessments for improvements to city property should be collected and in city treasury before work is contracted for. It would enable many laboring men to own a home who do not attempt to get one under the present system.
143. LABORER (FARM)—A law limiting any man to own over 160 acres and a shorter day for farm laborers.
146. MACHINIST—Laws eliminating profits, interest, taxes and rent.
147. MACHINIST—Stop government of strikes by injunction and establish an arbitration board.
154. MACHINIST—Anti-child labor laws and stricter factory inspection.
155. MACHINIST—Public ownership of large corporations.
157. MACHINIST—First, give us a strict Sunday labor law. Second, enlarge the power of the Bureau of Labor Statistics.
159. MACHINIST—Local option in methods of taxation, and strict factory inspection with authority to enforce safe and sanitary conditions by inspectors.
164. MINER—Non-partisan board of mine examiners. Compulsory education. Prohibit boys working in mines until they attain the age of 14.
165. MINER—More strict inspection of mines. State ownership of mines.
168. MINER—Enforcement of mine inspection laws and election of mine inspectors.
169. MINER—Have the gypsum mines included under the state coal mining laws.
170. MINER—Better screen laws. At present the miner gets nothing for mining nut, pea and steam coal and the companies get good prices for it.
171. MINER—Establish a state board of arbitration, to whom all disputes should be referred.
173. MINER—Make the wealthy pay taxes at same rate as I pay on my little home.

175. MINER—Election of mine inspectors by popular vote.

176. MINER—More cubic feet of air per miner. Operators to furnish shot firers. My wage of \$310 exceptionally good this year, as work was plenty.

179. Miner—Give the mine inspectors more power and pass a law to abolish the company stores, which compel a man to buy of them at big prices in order to get a job.

183. MOLDER—Nothing under present administration.

185. MOTORMAN—Street railroads should be owned and operated by the city. The employees would then get better treatment.

186. MOTORMAN—A Sunday observance law.

189. PAINTER—I believe in trusts, but think they should be controlled by the people for the people.

194. PAINTER—Sound money. Republican principles carried through.

196. PAINTER—A state insurance and accident department and a state eight-hour law.

198. PAINTER—An eight-hour law is badly needed.

200. PAINTER—Many things needed, but eight-hour law most important.

202. PATTERNMAKER—Compulsory factory inspection.

205. PLUMBER—City ordinances governing plumbing, heating and ventilation.

207. PLUMBER—Enact laws for adequate sanitation.

213. PRINTER—Factory inspection, and the placing of the union label on all state documents.

214. PRINTER—Government ownership of all means of production and distribution.

215. PRINTER—Abolish all forms of taxation except a single tax on land values. No specific legislation; what would benefit me would injure some one else.

221. PRINTER—This inquiry is a step in the right direction.

227. REPORTER—Restrict people following employments until they comply with specific educational qualifications like lawyers and doctors.

230. TAILOR—Poor ventilation, unsanitary condition of work rooms. Factory inspection would remedy it.

233. TAILOR—Prohibit the sale of sweat shop goods without such articles are so labeled.

234. TAILOR—Ventilated sanitary shops to be provided for tailors by employers.

238. TEAMSTERS—City ordinances required by act of legislature to favor home labor in letting of all municipal contracts so our men can be employed.

239. TELEGRAPHER—Laws needed to limit a days work to twelve hours and the blessing of a Sunday occasionally.

240. TELEGRAPHER—State examination for competency to license telegraph operators, and shorter hours.

241. TELEGRAPHER—Government ownership of telegraphs.

243. TELEGRAPHER—Twelve to sixteen hours labor, 365 days in the year makes a man want at least a Sunday labor law and government control of all public utilities.

244. TELEGRAPHER—Legislation retards industry rather than benefits.

246. TELEGRAPHER—Limit a working day to ten or eleven hours.

248. TELEGRAPHER—Government ownership of telegraphs; law requiring certificate of ability.

252. TYPEWRITER ADJUSTER—Legal enactment for reduction of hours worked in a day, and strict factory inspection laws, compelling employers to look after welfare of employees.

253. TYPEWRITER DRILLER—Compulsory education. Child labor restricted until they reach fifteen years.

258. WAITER—Strict factory inspection; with power to remedy unsanitary evils; is no where needed more than in restaurants and kitchens.

259. WAITER—Appoint a state sanitary inspector.

260. WAITER—Encourage small factories in the state so as to do away with trusts.

261. WAITER—Unsanitary condition of restaurants endanger health of employees.

262. WOODWORKER—Enact and enforce laws to blow dust away from woodworking machines.

263. WOODWORKER—Compulsory education and restriction of child labor.

266. WOODWORKER—State factory inspection that would compel our employers to put a floor down, and install dust collectors on machines, ventilate and light the shops properly.

267. WOODWORKER—Reduction of hours for days work by state would regulate hours on all other work.

268. WOODWORKER—Enact laws to keep child labor out of factories.

REMARKS BY WAGEEARNERS ON CONVICT LABOR.

How convicts should be employed so that their labor would not conflict with the wage earners' interests to pay for maintenance and aid in their reformation

1. BAKER—Work on public roads, or the state to pay them \$1.50 per day, the same to go to the convict's dependent family, or paid to the convict on expiration of term if no family dependent.

3. BARBER—Manufacture goods for state institutions and use convicts for improving public highways.

4. BARBER—The convicts should be employed by the various counties to build good roads, and the county receiving such benefit to pay costs to state.

8. BARBER—Use them to improve public highways, and to make goods to be used by themselves and other state institutions.

16. BLACKSMITH—Label prison goods as convict made.

22. BOOKBINDER—Let the convicts make goods for state institutions.

23. BOOKKEEPER—Good, hard roads are needed. Put the convicts to work making them.

24. BOOKKEEPER—Employ convicts making good roads at county expense.

25. **BOOKKEEPER**—Employ convicts according to the proposition of the late Titus bill, on state account. Put his surplus product on market at regular prices, so as to protect the employer and employed. Sentence for life the public man who favors the introduction of a third party, in the shape of a contractor, between the state and the criminal.

26. **BOOKKEEPER**—Do away with present wage system and lessen the number of criminals.

27. **BOOKKEEPER**—Concrete or macadamize the public roads by convict labor.

29. **BOOKKEEPER**—Confine the convict with the object of reformation, and not for profit to state or contractor. Limit his labor to products used by state institutions. Pay convict a percentage of his earnings. Mark all surplus products for open market "*Prison made.*"

30. **BOILERMAKER**—Manufacture products that they need and improve the public highways.

31. **BOILERMAKER**—Employ convicts to keep prisons clean. Abolish the contract system.

32. **BOILERMAKER**—Work him on the roads. They need improving.

33. **BOILERMAKER**—Abolish contract system. Establish state account system.

36. **BRAKEMAN**—Employ convicts at labor within prison walls, and only to the extent that will cover the expense of confinement.

38.—**BRICKLAYER**—Work them on the roads.

40. **BRICKLAYER**—Employ convicts breaking rock and improving public roads.

42. **BRICKLAYER**—By improving country roads.

43. **BROOM MAKER**—Stop convicts making brooms, which takes away our living.

44. **BROOM MAKER**—Stop contract system and establish state use system.

45. **BROOM MAKER**—Making brooms and brushes in prison hurts our trade.

46. **BUTTON WORKER**—Employ convicts on country roads.

48. **BUTTON CUTTER**—Employ convicts on public work and on state account. Prevent his competition in the open market with honest labor.

49. **BUTTON CUTTER**—Let convicts work on state account and prevent his product coming into the open market on a competitive basis to the injury of free labor. Abolish the contract system of convict labor.

50. **BUTTON CUTTER**—Improve streets and roads.

51. **CARPENTER**—Change conditions in society so that we won't have convicts.

53. **CARPENTER**—Reorganize society on a co-operative basis and convicts will need no reformatory. Competition makes criminals.

58. **CARPENTER**—Work the convicts on state account or on public roads.

64. **CIGAR MAKER**—Convict labor would be a benefit to the public if the wage system were abolished and public co-operation established.

65. **CIGAR PACKER**—Convict labor should be used to provide supplies for state institutions.

66. **CIGAR MAKER**—Employ convicts to produce commodities for use in state institutions and abolish contracting their labor.

67. CIGAR MAKER—State account system is the most just.
72. CIGAR MAKER—Employ convicts to improve public highways.
75. CLERK, RETAIL—The convict's labor should be utilized to make prisons and state institutions self-supporting and lighten expenses of the tax payer.
76. CLERK, RETAIL—Convicts might make goods for public institutions and improve highways. They should not make any goods for sale in the open market.
77. CLERK, RETAIL—Teach the convict the trade he shows adaptability for so he can earn an honest living when his sentence expires. His food should be scant and his work hard; he deserves punishment.
- Prison made goods should not be sold below market prices.
80. CLERK, SHIPPING—Manufacture articles on state account for state use. Abolish the contract system.
81. CLERK, RETAIL—All wages earned by a convict over what it costs to maintain him should be sent his family. If the convict has no family or serving a life sentence it should go to charitable institutions.
83. CLERK, RETAIL—Convict made goods should not be shipped out of the state where manufactured, and should be labeled "prison made" so purchasers could not be deceived.
86. CLERK, JEWELRY—Let convicts manufacture only such things as are needed in penitentiaries. Balance of time improve public roads.
87. CLERK, RETAIL—Convicts should build roads, irrigation works, and build, improve and supply state institutions on state account system, improve waterways and all other work that does not place the product on the market to compete with that of free labor.
88. CLERK, RETAIL—First teach the convict a trade if he has none, so he can earn a living on expiration of sentence.
- By no means allow him to compete with the labor of the honest citizen.
94. CONDUCTOR, R. R.—Let convicts build good permanent roads.
98. CONDUCTORS—Discharge the contractors and put humane men in charge of convicts.
99. COOPER—We are suffering from convict competition.
100. COOPER—The late Titus bill would be satisfactory to regulate convict labor so they could work for state and county institutions.
101. COOPER—Abolish convict contract labor, employ them according to provisions made in Titus bill so that their labor will supply necessities for state institutions.
102. COOPER—Abolition of contract convict labor; employ convicts building good roads.
103. ELECTRICIAN—The tax payer and wage earner should be protected by the state, the state getting all the product of the convict's labor.
107. ELECTROTYPYPER—Allow convicts to support themselves, but under no circumstances should they compete with free labor.
109. ENGINEER—Employ the convicts supplying the state institutions but not to compete in open market with basket, chair and button makers and reduce their wages by competition with convict made products.
112. ENGINEER—First abolish the wage system; then reform society, which would include the convict; make the convict an economic equal; there could then be no competition between prison and so-called free labor.

118. **ENGINEER**—Let convicts work for the state and not for a contractor.
119. **ENGINEER**—Improve public roads and break rock.
125. **FIREMAN**—Do not employ convicts at all; commit them to solitary confinement and crime will decrease 75 per cent. in ten years.
133. **HARNESSE MAKER**—Leather goods made by convicts in other states injures labor in Iowa for harness makers. Convicts should be made to build good roads.
138. **HORSESHOER**—Let convicts build good roads, which would be a permanent benefit to society, and deprive no man of an opportunity to labor.
139. **LABORER**—Abolish the contract system, remove all machinery from prisons, and employ the convicts at hand labor only.
145. **LATHER**—The present plan is all right.
146. **MACHINIST**—I would recommend the Elmira system of New York state as the most equitable for convict employment.
149. **MACHINIST**—Make the convicts produce all they need, but stop their productions from coming into the market to compete with that of free labor.
157. **MACHINIST**—The Elmira system of penal reform should be instituted. Convicts' products should be consumed by other state institutions.
159. **MACHINIST**—Employ convicts on state account, per arrangement of Titus bill. The contractor or third party should be excluded from intruding on reformation, his presence is actuated purely for profit and it demoralizes the convict and the state.
- MILLWRIGHT**—Employ the convict on what he shows capacity for. Give him a percentage of his earnings when released. This will encourage him while confined, and enable him to reform when free.
163. **MILLER**—Work the convicts by and for the state and not for contractors.
164. **MINER**—Let convicts improve the highways.
185. **MOTORMAN**—Teach convicts a trade and let their work be for state institutions. This plan would reduce taxation on business men and wage earners.
188. **PAINTER**—Let convicts build good roads in the state, and not let the state sell their labor to a few contractors for 55 cents a day.
196. **PAINTER**—Let convicts manufacture all such articles as are made by trusts or combinations.
198. **PAINTER**—Stop convict contracts that compete with free labor.
214. **PRINTER**—Adopt the New York system. Convicts to make supplies for state institutions only.
215. **PRINTER**—"The laborer is worthy of his hire," even though he has committed crime. Pay the convict the full amount of the value of his work, less the amount needed to restore what he stole or destroyed.
220. **PRINTER**—Let the convict make goods for state, not for open market.
227. **REPORTER**—Convict competition is so insignificant that the prices of commodities or wages are not affected. Teach convicts such work that they may find employment when released.
235. **TAILOR**—Convicts to manufacture such articles as are used by state institutions only.

253. **TYPEWRITER DRILLER**—Charge the convict his cost of maintenance, give him the balance of his wages, which should be the market or union rate.

WAGE EARNERS

Nativity, Occupation, Earnings.

Marginal number.	OCCUPATION.	Locality where employed.	Nativity.	WAGES.		Working hours per day.
				Rate.	Per	
1	Baker.....	Sioux City.....	Wisconsin.....	\$ 0.13	Hour..	12
2	Baker.....	Oskaloosa.....	Germany.....	(b) 15.00	Month..	12
3	Barber.....	Des Moines.....	Illinois.....	12.00	Week..	12
4	Barber.....	Lyons.....	Illinois.....	(f) .65	Cent..	15
5	Barber.....	Burlington.....	Iowa.....	8.00	Week..	12
6	Barber.....	Cedar Rapids.....	Mass.....	10.00	Week..	13
7	Barber.....	Clinton.....	Iowa.....	10.00	Week..	13
8	Barber.....	Des Moines.....	Indiana.....	11.00	Week..	11
9	Barber.....	Oskaloosa.....	Rhode Island.....	9.00	Week..	12
10	Barber.....	Oskaloosa.....	Iowa.....	8.00	Week..	13
11	Barber.....	Oskaloosa.....	Iowa.....	10.00	Week..	13
12	Baker.....	Oskaloosa.....	Iowa.....	(b) 7.00	Week..	10
13	Bartender.....	Sioux City.....	Iowa.....	9.00	Week..	10
14	Barber.....	Sioux City.....	Wisconsin.....	14.00	Week..	12
15	Blacksmith.....	Missouri Valley.....	Missouri.....	52.00	Month..	10
16	Blacksmith.....	Ottumwa.....	Sweden.....	.25	Hour..	10
17	Blacksmith.....	Ottumwa.....	Iowa.....	52.00	Month..	10
18	Blacksmith.....	Ottumwa.....	Iowa.....	.15	Hour..	10
19	Blacksmith.....	Sioux City.....	Ohio.....	.28	Hour..	10
20	Bookbinder.....	Des Moines.....	Iowa.....	16.00	Week..	9
21	Bookbinder.....	Des Moines.....	Iowa.....	15.00	Week..	9
22	Bookbinder.....	Sioux City.....	Iowa.....	20.00	Week..	9
23	Bookkeeper.....	Bussey.....	Wisconsin.....	8.00	Week..	8
24	Bookkeeper.....	Davenport.....	England.....	90.00	Month..	9
25	Bookkeeper.....	Des Moines.....	Massachusetts.....	60.00	Month..	8
26	Bookkeeper.....	Des Moines.....	South Carolina.....	100.00	Month..	(i)...
27	Bookkeeper.....	Missouri Valley.....	Iowa.....	9.00	Week..	10
28	Bookkeeper.....	Sioux City.....	Ohio.....	18.00	Week..	10
29	Bookkeeper.....	Sioux City.....	Iowa.....	.....	.....	(i)...
30	Boilermaker.....	Boone.....	Germany.....	15.00	Week..	10
31	Boilermaker.....	Clinton.....	Illinois.....	2.25	Day..	10
32	Boilermaker.....	Des Moines.....	New York.....	15.00	Week..	10
33	Boilermaker.....	Sioux City.....	Iowa.....	17.00	Week..	10
34	Brakeman.....	Clinton.....	Nebraska.....	.02	Mile..	(i)...
35	Brakeman.....	Dubuque.....	Wisconsin.....	.02	Mile..	(i)...
36	Brakeman.....	Mason City.....	New York.....	.02	Mile..	24
37	Brakeman.....	Moulton.....	Missouri.....	.02	Mile..	9
38	Bricklayer.....	Burlington.....	Iowa.....	.45	Hour..	9
39	Bricklayer.....	Des Moines.....	Missouri.....	.50	Hour..	8
40	Bricklayer.....	Muscatine.....	Pennsylvania.....	.30	Hour..	9
41	Bricklayer.....	Marshalltown.....	Germany.....	0.45	Hour..	8
42	Bricklayer.....	Sioux City.....	Illinois.....	.30	Hour..	9
43	Broom maker.....	Burlington.....	New Jersey.....	a 1.75	Day..	10

a. Average daily earnings piecework.

b. With board.

c. With commission.

d. Seven days a week.

e. Extra income.

OF IOWA.

Hours, Insurance, Home, Etc.

MARGINAL NUMBERS.	Yearly Earnings.	If member of labor union.	AMOUNT OF INSURANCE CARRIED.		THE HOME		
			Life.	Fire.	Owned?	Incumbrance.	Amount rent per month.
1	\$ 500	Yes	\$ 3,000	\$ 600	Yes	\$ 500	.....
2	(b) 172	Yes	.....	.....	No	.....	\$ 6.00
3	624	Yes	.....	.....	No	.....	16.00
4	430	Yes	.....	.....	No	.....	(s) 4.00
5	377	Yes	2,000	.....	No	.....	8.00
6	500	Yes	2,000	.....	No	.....	7.00
7	470	No	1,000	300	No	.....	7.50
8	480	Yes	.....	.....	No	.....	6.00
9	383	Yes	.....	.....	Yes	160	.....
10	400	Yes	2,000	.....	No	.....	(s) 3.00
11	480	Yes	1,000	700	Yes	500	.....
12	400	Yes	.....	.....	No	.....	(s) 3.00
13	450	Yes	1,000	300	No	.....	.....
14	700	Yes	.....	.....	.....	.....	.....
15	626	No	1,000	.....	No	.....	(s) 5.00
16	600	Yes	2,000	1,300	Yes	400	.....
17	575	Yes	.....	.....	No	.....	8.33
18	305	Yes	.....	.....	No	.....	5.00
19	800	No	3,000	.....	No	.....	15.00
20	750	Yes	.....	.....	.....	.....	.....
21	720	Yes	.....	500	No	.....	12.50
22	900	Yes	2,000	.....	No	.....	12.00
23	535	No	2,000	.....	Yes	250	.....
24	(e) 1,500	No	.....	.....	No	.....	10.00
25	720	Yes	.....	.....	.....	.....	.....
26	(n) 1,200	Yes	6,000	610	Yes	None	.....
27	240	No	.....	.....	.....	.....	.....
28	900	No	3,000	1,500	Yes	836	.....
29	(n) 1,400	Yes	2,400	.....	No	.....	.....
30	720	Yes	2,000	.....	No	.....	12.00
31	.....	No	6,000	1,150	Yes	500	.....
32	720	Yes	.....	.....	Yes	800	.....
33	820	Yes	3,500	500	Yes	250	.....
34	720	Yes	1,200	600	No	.....	11.00
35	890	Yes	1,200	300	No	.....	8.00
36	545	Yes	2,800	800	No	.....	12.00
37	720	Yes	2,300	350	Yes	30	.....
38	(n) 615	Yes	4,000	1,700	Yes	1,000	.....
39	(n) 825	Yes	.....	.....	No	.....	25.00
40	.....	Yes	2,000	400	No	.....	6.00
41	(n) 350	Yes	400	.....	.....	.....	6.00
42	(n) 494	Yes	.....	.....	No	.....	.....
43	.....	Yes	2,000	.....	No	.....	10.00

f. Percentage system.

i. Irregular hours.

n. Not employed steadily.

s. Room rent, single man.

WAGE EARNERS

Nativity, Occupation, Earnings,

Marginal Number.	OCCUPATION.	Locality where employed.	Nativity.	WAGES.		Working hours per day.
				Rate.	Per	
44	Broom maker.....	Des Moines.....	Illinois.....	a 1.75	Day.....	10
45	Broom maker.....	Dubuque.....	Missouri.....	a 1.75	Day.....	10
46	Button worker.....	Muscatine.....	Illinois.....	a 1.40	Day.....	10
47	Button worker.....	Muscatine.....	Germany.....	a 1.25	Day.....	10
48	Button cutter.....	Muscatine.....	Iowa.....	a 1.75	Day.....	10
49	Button cutter.....	Muscatine.....	Iowa.....	a 1.40	Day.....	10
50	Button cutter.....	Muscatine.....	Iowa.....	a 1.50	Day.....	10
51	Carpenter.....	Burlington.....	Germany.....	2.00	Day.....	9
52	Carpenter.....	Clinton.....	New York.....	2.25	Day.....	10
53	Carpenter.....	Clinton.....	Iowa.....	2.00	Day.....	10
54	Carpenter.....	Cedar Rapids.....	Massachusetts.....	2.50	Day.....	10
55	Carpenter.....	Des Moines.....	Pennsylvania.....	2.50	Day.....	8
56	Carpenter.....	Dubuque.....	Pennsylvania.....	2.50	Day.....	10
57	Carpenter.....	Fort Dodge.....	New York.....	2.00	Day.....	10
58	Carpenter.....	Muscatine.....	Canada.....	9.00	Week.....	10
59	Carpenter.....	Ottumwa.....	Kansas.....	2.25	Day.....	10
60	Carpenter.....	Sioux City.....	Sweden.....	2.00	Day.....	10
61	Carriagemaker.....	Council Bluffs.....	Sweden.....	1.75	Day.....	10
62	Carriage maker, forem'n	Council Bluffs.....	Michigan.....	2.50	Day.....	10
63	Carriage maker, forem'n	Grinnell.....	Iowa.....	100.00	Month.....	10
64	Cigarmaker.....	Burlington.....	Iowa.....	a 1.65	Day.....	8
65	Cigar packer.....	Burlington.....	Iowa.....	a 2.00	Day.....	8
66	Cigar maker.....	Davenport.....	New York.....	a 2.00	Day.....	8
67	Cigar maker.....	Des Moines.....	Prussia.....	a 1.60	Day.....	8
68	Cigarmaker.....	Des Moines.....	Pennsylvania.....	a 2.00	Day.....	8
69	Cigar maker.....	Dubuque.....	Iowa.....	a 2.00	Day.....	8
70	Cigar maker.....	Keokuk.....	Iowa.....	a 1.90	Day.....	8
71	Cigar maker.....	Ottumwa.....	Pennsylvania.....	a 1.75	Day.....	8
72	Cigarmaker.....	Oskaloosa.....	Iowa.....	a 2.00	Day.....	8
73	Cigar maker.....	Sioux City.....	Michigan.....	a 2.50	Day.....	8
74	Cigarb'x trimm'r, female	Sioux City.....	Iowa.....	a 1.00	Day.....	10
75	Clerk, retail.....	Boone.....	Iowa.....	2.25	Day.....	10
76	Clerk, retail.....	Clinton.....	Germany.....	50.00	Month.....	10
77	Clerk, retail.....	Council Bluffs.....	Iowa.....	45.00	Month.....	10
78	Clerk, shipping.....	Davenport.....	Missouri.....	52.00	Month.....	10
79	Clerk, railway.....	Des Moines.....	Sweden.....	40.00	Month.....	12
80	Clerk, railway.....	Sioux City.....	New York.....	60.00	Month.....	12
81	Clerk, retail.....	Des Moines.....	Iowa.....	8.50	Week.....	10
82	Clerk, shipping.....	Grinnell.....	New York.....	0.16	Hour.....	10
83	Clerk, retail.....	Muscatine.....	Switzerland.....	12.00	Week.....	10
84	Clerk, shipping.....	Muscatine.....	France.....	12.00	Week.....	10
85	Clerk, retail.....	Oskaloosa.....	Hungary.....	50.00	Month.....	10½
86	Clerk, jewelry.....	Ottumwa.....	Illinois.....	20.00	Week.....	11
87	Clerk, retail.....	Ottumwa.....	Sweden.....	12.75	Week.....	10½
88	Clerk, retail.....	Sioux City.....	Massachusetts.....	15.00	Week.....	10½
89	Clerk, drug.....	Sioux City.....	Iowa.....	45.00	Month.....	d 15
90	Conductor, railroad.....	Burlington.....	Louisiana.....	125.00	Month.....	1
91	Conductor, railroad.....	Creston.....	Illinois.....	0.03	Mile.....	1
92	Conductor, railroad.....	Clinton.....	Illinois.....	0.03	Mile.....	1
93	Conductor, railroad.....	Clinton.....	New York.....	0.03	Mile.....	1
94	Conductor, railroad.....	Dubuque.....	Louisiana.....	0.03	Mile.....	1
95	Conductor, railroad.....	Lake City.....	Iowa.....	0.03	Mile.....	1
96	Conductor, railroad.....	Mason City.....	Illinois.....	0.03	Mile.....	1
97	Conductor, railroad.....	Perry.....	Ohio.....	0.03	Mile.....	1
98	Conductor, railroad.....	Sioux City.....	Ohio.....	0.03	Mile.....	1
99	Cooper.....	Des Moines.....	Illinois.....	0.08	Barrel.....	1
100	Cooper.....	Dubuque.....	Illinois.....	a 1.25	Day.....	10
101	Cooper.....	Dubuque.....	Austria.....	a 1.50	Day.....	10
102	Cooper.....	Sioux City.....	New Jersey.....	18.00	Week.....	10
103	Electrician (foreman).....	Des Moines.....	Illinois.....	5.00	Day.....	9

a. Average daily earnings piecework

b. With board.

c. With commission.

d. Seven days a week.

e. Extra income.

OF IOWA.

Hours, Insurance, Home, Etc.

MARGINAL NUMBER.	Yearly earnings.	If member of labor union.	AMOUNT OF INSURANCE CARRIED.		THE HOME.		
			Life	Fire.	Owned?	Incumbrance.	Amount rent per month.
44		Yes..					
45		Yes..			No..		9 00
46		No..	2,000		No..		5.00
47	200	Yes..	700				
48	440	Yes..			No..		6.00
49	325	Yes..			No..		
50	300	Yes..	1,000	200	No..		4.00
51		Yes..	1,000		Yes..	None	
52	" 336	No..			No..		10.00
53		No..			No..		3.50
54	" 395	Yes..			No..		10.00
55		Yes..	3,000		No..		16.00
56		Yes..	2,000		No..		9.00
57	600	Yes..					
58	410	No..		200	Yes..	40 00	
59	574	Yes..	3,200		No..		10.00
60	420	No..	1,000		No..		12.00
61	500	No..	1,000		No..		12.00
62	900	No..			No..		15.00
63	1,200	No..	3,000	2,000	Yes..	1,500.00	
64	432	Yes..			No..		6.00
65	624	Yes..	3,000	700	Yes..	7 00	
66	550	Yes..		2,000	Yes..	1 50c	
67	300	Yes..	1,000		No..		6.50
68	650	Yes..	2,000	300	No..		9.00
69	58c	Yes..	1,350		No..		8.00
70	470	Yes..	700		No..		
71		Yes..	1,000				
72	600	Yes..					
73	720	Yes..	2,000	500	No..		15.00
74	300	Yes..			No..		10.00
75	660	Yes..	2,000		No..		
76	645	Yes..	4,000		No..		
77		Yes..					
78	664	No..	1,000	1,000	Yes..		
79	480	No..	4,000	1,400	Yes..		
80	720	No..	4,000	1,000	Yes..	800	
81	408	Yes..		500	No..		
82	490	No..		800	Yes..	600	
83	950	Yes..	7,000	1,100	Yes..	500	
84	624	Yes..	2,000	1,200	Yes..	600	
85	600	Yes..			No..		6.00
86	1,010	Yes..	4,000	1,300	Yes..	8c0	
87	610	Yes..	2,000	1,000	Yes..	230	
88	780	Yes..	1,000	1,500	Yes..	800	
89	465	No..	2,000		No..		
90	1,480	Yes..	6,800	1,000	No..		16.00
91	1,200	Yes..	5,000	1,000	Yes..	250	
92	1,200	Yes..	3,000	500	No..		15 00
93	960	Yes..	2,000	500	No..		19 00
94	1,170	Yes..	3,000	500	No..		12.00
95	1,110	Yes..	2,000		No..		10.00
96	1,270	Yes..	4,000	2,000	Yes..	1,200	
97	1,000	Yes..	2,000	750	Yes..	200	
98	1,080	Yes..	3,000	500	No..		12.00
99	" 300	Yes..			No..		0 00
100	350	Yes..	2,000		No..		5.50
101	340	Yes..			No..		4.00
102	920	Yes..	3,000	300	Yes..	None	
103	1,400	Yes..	2,000		No..		12.00

f. Percentage system.

i. Irregular hours.

n. Not employed steadily.

s. Room rent, single man.

WAGE EARNERS

Nativity, Occupation, Earnings,

Marginal number.	OCCUPATION.	Locality where employed.	Nativity.	WAGES.		Working hours per day.
				Rate.	Per	
104	Electrician	Des Moines	Iowa	\$ 2.25	Day	9
105	Electrician (lineman) ..	Des Moines	Kansas	65.00	Month ..	i
106	Electrician (engineer) ..	Sioux City	Missouri	0.35	Hour	d 10
107	Electrifier & stereotyper	Des Moines	Wisconsin	15.00	Week	10
108	Electrifier & stereotyper	Sioux City	Iowa	16.00	Week	10
109	Engineer (locomotive) ..	Burlington	Wisconsin	0.31	Hour	10
110	Engineer, locomotive ..	Clinton	Iowa	0.04	Mile	i
111	Engineer, locomotive ..	Boone	England	0.04	Mile	i
112	Engineer, locomotive ..	Des Moines	Illinois	0.037	Mile	i
113	Engineer, locomotive ..	Des Moines	England	0.037	Mile	i
114	Engineer, locomotive ..	Mason City	Illinois	0.037	Mile	5
115	Engineer, locomotive ..	Oelwein	Iowa	0.037	Mile	i
116	Engineer, locomotive ..	Oskaloosa	Iowa	0.037	Mile	i
117	Engineer, locomotive ..	Ruthven	Illinois	70.00	Month ..	12
118	Engineer, locomotive ..	Sioux City	Iowa	0.037	Mile	i
119	Engineer, hoisting	Des Moines	Canada	0.25	Hour	10
120	Engineer, hoisting	Jerome	Scotland	d 50.00	Month ..	11
121	Engineer, stationary ..	Sioux City	Iowa	12.00	Week	12
122	Fireman, locomotive ..	Lake City	Ohio	0.022	Mile	i
123	Fireman, locomotive ..	Dubuque	Iowa	0.022	Mile	i
124	Fireman, locomotive ..	Estherville	Illinois	0.03	Mile	i
125	Fireman, locomotive ..	Fort Madison	Iowa	0.023	Mile	i
126	Fireman, locomotive ..	Oelwein	Pennsylvania ..	0.022	Mile	i
127	Fireman, locomotive ..	Walsh	Iowa	0.02	Mile	12
128	Fireman, locomotive ..	Waterloo	Iowa	0.022	Mile	i
129	Fireman, locomotive ..	Valley Junction ..	Iowa	0.025	Mile	12
130	Fireman, brick kiln	Des Moines	Iowa	1.35	Day	12
131	Fireman, stationary ..	Muscatine	Iowa	1.50	Day	a 12
132	Fireman, stationary ..	Sioux City	Massachusetts ..	1.80	Day	a 13
133	Harness maker	Waterloo	Ohio	a 2.00	Day	10
134	Harness maker	Boone	Kentucky	a 2.00	Day	10
135	Harness maker	Sioux City	Pennsylvania ..	a 2.00	Day	10
136	Horseshoer	Burlington	Iowa	45.00	Month ..	10
137	Horseshoer	Cedar Rapids	Iowa	15.00	Week	10
138	Horseshoer	Des Moines	Ohio	15.00	Week	9
139	Laborer (foundry)	Clinton	Iowa	1.75	Day	10
140	Laborer (factory)	Des Moines	Iowa	0.11	Hour	10
141	Laborer (boiler shop) ..	Fort Madison	Iowa	1.25	Day	10
142	Laborer (building)	Sioux City	Ohio	1.75	Day	10
143	Laborer (farm)	Strahan	Iowa	b 17.00	Month ..	b 11
144	Lather	Clinton	Iowa	0.02	Yard	8
145	Lather	Des Moines	Iowa	2.50	Day	8
146	Machinist	Burlington	Illinois	2.25	Day	10
147	Machinist	Cedar Rapids	Scotland	0.26	Hour	8
148	Machinist	Davenport	Iowa	0.25	Hour	10
149	Machinist (linotype) ..	Des Moines	New York	0.30	Hour	10
150	Machinist (jobbing) ..	Des Moines	New York	0.25	Hour	10
151	Machinist (railroad) ..	Des Moines	Nebraska	0.27½	Hour	10
152	Machinist	Fort Dodge	Indiana	0.22½	Hour	10
153	Machinist	Boone	Iowa	0.26	Hour	10
154	Machinist	Marshalltown	Illinois	0.26	Hour	10
155	Machinist	Missouri Valley ..	Illinois	0.27½	Hour	10
156	Machinist	Oelwein	Wisconsin	0.27½	Hour	10
157	Machinist	Sioux City	New York	0.28½	Hour	10
158	Machinist	Muscatine	Illinois	0.22½	Hour	10
159	Machinist	Sioux City	Iowa	0.29	Hour	10
160	Machinist-helper	Des Moines	Kansas	0.14	Hour	10
161	Machinist, apprentice ..	Sioux City	Wisconsin	0.15	Hour	10
162	Metal polisher	Des Moines	Iowa	2.25	Day	10
163	Miller	Dubuque	Germany	9.00	Week	10

a. Average daily earnings piecework.

b. With board.

c. With commission.

d. Seven days a week.

e. Extra income.

OF IOWA—CONTINUED.

Hours, Insurance, Home, Etc.

MARGINAL NUMBER.	Yearly earnings.	If member of labor union	AMOUNT OF INSURANCE CAR-RIED.		THE HOME.		
			Life.	Fire.	Owned?	Incum-brance.	Amount rent per month.
104	\$ 625	Yes.	\$ 2,000		Yes..	None	
105	820	Yes..	2,100	\$ 800	Yes..	\$ 300	
106	1,008	Yes..	2,000	3,000	Yes..	2,000	
107	780	Yes..	2,000		No		12.00
108	800	Yes..	2,500	300	Yes..	300	
109		Yes..	1,500	500	No		10.00
110	928	Yes..	3,000	1,600	Yes..	None	
111	1,235	Yes..	2,500	1,600	Yes..	None	
112		No	2,000	600			16.00
113	1,180	No			No		
114	1,500	Yes..	4,500	1,000	Yes..	500	
115	1,680	No			No		14.00
116	836	Yes..	3,900	2,200	Yes..	None	
117	840	No	6,000	1,500	Yes..	None	
118	920	Yes..	2,000		No		10.00
119	500	No	3,500	500	No		8.33
120	600	Yes..		500	Yes..	None	
121	600	No			No		6.00
122		Yes..	500		Yes..	None	
123	800	Yes..	2,000		No		\$ 10.00
124	900	Yes..	3,000	500	Yes..	600	
125		Yes..	3,500	500	Yes..		
126	762	Yes..	2,500		No		\$ 7.00
127	680	Yes..	1,500		No		\$ 7.00
128	787	Yes..	1,500		No		\$ 6.00
129	700	Yes..	500		No		\$ 5.00
130	300	Yes..			No		7.00
131	450	Yes..	2,000		No		
132	440	Yes..	3,000		No		6.00
133	634	Yes..	1,000	900	Yes..	1,800	
134	600	Yes..	2,000		No		10.00
135	560	Yes..	1,000		No		8.00
136	540	No	2,000		No		7.00
137		Yes..	2,000	9.0	Yes..	250	
138	630	Yes..	3,000	500	Yes..	1 1 0	
139	480	Yes..	2,000	1,800	Yes..	None	
140	280	No		750	Yes..	1,000	
141	386	No	1,000	300	Yes..	200	
142	300	No	1,000		No		7.00
143	6 168	No					
144	400	No	500		No		8.00
145	500	Yes..	2,000	950	Yes..	650	
146	675	No	3,000	1,400	Yes..		
147	600	Yes..		1,000	Yes..	400	
148	680	Yes..	2,000		No		12.00
149	936	Yes..			No		13.00
150	750	Yes..	1,000		No		14.00
151	800	Yes..	2,000	800	No		14.00
152	650	No					
153	760	Yes..	1,000	800	Yes..	None	
154	720	Yes..	2,000	1,000	Yes..	300	
155	850	Yes..	80	1,500	Yes..		
156	783	Yes..	2,000		No		\$ 4.00
157	1,000	Yes..	1,000		No		8.00
158	600	No	500		No		7.00
159	850	Yes..	6,500	500	No		10.00
160	330	No			No		
161	400	Yes..		500	No		10.00
162	408	No			No		7.00
163	450	Yes..	500		Yes..	300	

f. Percentage system.

i. Irregular hours.

n. Not employed steadily.

s. Room rent, single man.

WAGE EARNERS

Nativity, Occupation, Earnings,

Marginal number.	OCCUPATION.	Locality where employed.	Nativity.	WAGES.		Working hours per day.
				Rate.	Per	
164	Miner (coal).....	Beacon.....	Wales.....	\$ 0.75	Ton.....	8
165	Miner (coal).....	Boonsboro.....	Pennsylvania.....	0.90	Ton.....	8
166	Miner (coal).....	Bussey.....	Connecticut.....	0.75	Ton.....	8
167	Miner (coal).....	Centerville.....	Illinois.....	0.85	Ton.....	8
168	Miner (coal).....	Centerville.....	Illinois.....	2.00	Day.....	8
169	Miner (gypsum).....	Coalville.....	Canada.....	1.75	Day.....	8
170	Miner (coal).....	Des Moines.....	Kentucky.....	0.90	Ton.....	8
171	Miner (coal).....	Hamilton.....	Scotland.....	0.90	Ton.....	8
172	Miner (coal).....	Jerome.....	England.....	0.95	Ton.....	8
173	Miner (coal).....	Mystic.....	Missouri.....	0.85	Ton.....	8
174	Miner (coal).....	Oskaloosa.....	Scotland.....	0.75	Ton.....	8
175	Miner (coal).....	Ottumwa.....	Kentucky.....	2.00	Day.....	8
176	Miner (coal).....	Pekay.....	Missouri.....	0.75	Ton.....	8
177	Miner (coal weighman).....	Rathbun.....	England.....	1.25	Day.....	8
178	Miner (coal).....	Seymour.....	Scotland.....	0.85	Ton.....	8
179	Miner (coal).....	What Cheer.....	Scotland.....	0.75	Ton.....	8
180	Molder iron.....	Des Moines.....	Iowa.....	2.50	Day.....	10
181	Molder iron.....	Keokuk.....	Ohio.....	3.00	Day.....	10
182	Molder iron.....	Marshalltown.....	Germany.....	2.25	Day.....	10
183	Molder loon.....	Waterloo.....	Ohio.....	2.00	Day.....	10
184	Molder iron.....	Webster City.....	Iowa.....	2.75	Day.....	10
185	Motorman, Street Ry.....	Des Moines.....	Ohio.....	0.12½	Hour.....	a 10
186	Motorman, Street Ry.....	Des Moines.....	New York.....	0.18	Hour.....	12
187	Painter, wagon.....	Burlington.....	Germany.....	2.00	Day.....	9
188	Painter, house.....	Burlington.....	Illinois.....	2.25	Day.....	9
189	Painter and paper han'r.....	Burlington.....	England.....	a 2.00	Day.....	9
190	Painter and paper han'r.....	Clinton.....	Illinois.....	a 2.50	Day.....	10
191	Painter, carriage.....	Council Bluffs.....	Missouri.....	2.50	Day.....	10
192	Paint maker.....	Davenport.....	Iowa.....	2.25	Day.....	10
193	Paint grinder.....	Davenport.....	Iowa.....	0.27½	Hour.....	10
194	Paint maker (Supt).....	Davenport.....	Norway.....	125.00	Month.....	i
195	Painter (house).....	Davenport.....	Illinois.....	2.00	Day.....	9
196	Painter (house).....	Des Moines.....	England.....	0.27½	Hour.....	8
197	Painter (carriage fore'an).....	Grinnell.....	Kentucky.....	0.30	Hour.....	10
198	Painter (house).....	Keokuk.....	Iowa.....	0.22½	Hour.....	10
199	Painter (house).....	Ottumwa.....	Illinois.....	0.22½	Hour.....	9
200	Painter (house).....	Sioux City.....	Michigan.....	2.50	Day.....	9
201	Paper hanger.....	Sioux City.....	Norway.....	a 3.50	Day.....	9
202	Pattern maker.....	Burlington.....	Iowa.....	2.00	Day.....	10
203	Plaster.....	Cedar Rapids.....	Iowa.....	18.00	Week.....	8
204	Plaster.....	Des Moines.....	Illinois.....	3.50	Day.....	8
205	Plumber.....	Burlington.....	Iowa.....	18.00	Week.....	9
206	Plumber.....	Des Moines.....	Sweden.....	3.00	Day.....	8
207	Plumber.....	Sioux City.....	Nebraska.....	3.50	Day.....	8
208	Plumber.....	Waterloo.....	Iowa.....	2.00	Day.....	10
209	Printer (job).....	Cedar Rapids.....	Iowa.....	2.00	Day.....	9
210	Printer.....	Burlington.....	Iowa.....	2.50	Day.....	9
211	Printer (linotype).....	Clinton.....	Iowa.....	15.00	Week.....	8
212	Printer.....	Creston.....	Iowa.....	8.00	Week.....	10
213	Printer (linotype).....	Council Bluffs.....	Iowa.....	21.00	Week.....	8
214	Printer (job).....	Des Moines.....	Illinois.....	16.00	Week.....	9
215	Printer (linotype).....	Des Moines.....	Michigan.....	0.42	Hour.....	8
216	Printer.....	Dubuque.....	Iowa.....	15.00	Week.....	8
217	Printer.....	Keokuk.....	Missouri.....	6.00	Week.....	10
218	Printer.....	Keokuk.....	Illinois.....	15.00	Week.....	9
219	Printer.....	Marshalltown.....	Iowa.....	9.00	Week.....	10
220	Printer (foreman).....	Muscatine.....	Illinois.....	20.00	Week.....	9
221	Printer.....	Ottumwa.....	Iowa.....	2.75	Day.....	9
222	Printer.....	Oskaloosa.....	Iowa.....	8.00	Week.....	10
223	Printer.....	Waterloo.....	Iowa.....	13.00	Week.....	10

a. Average daily earnings piecework.

b. With board.

c. With commission.

d. Seven days a week.

e. Extra income.

OF IOWA—CONTINUED.

Hours, Insurance, Home, Etc.

MARGINAL NUMBER.	Yearly earnings.	If member of labor union.	AMOUNT OF INSURANCE CARRIED.		THE HOME.		
			Life.	Fire.	Owned?	Incumbrance.	Amount rent per month.
154	\$ 800	Yes	.....	\$ 1,100	Yes	None	.....
155	432	Yes	.....	.....	No	.....	\$ 5.00
156	610	Yes	.....	.....	Yes	200	.....
157	.....	Yes	.....	.....	No	.....	6.00
158	387	Yes	.....	200	No	.....	6.00
159	350	Yes	.....	.....	Yes	None	.....
170	480	Yes	.....	.....	No	.....	15.00
171	360	Yes	.....	.....	No	.....	5.00
172	420	Yes	.....	.....	No	.....	5.00
173	400	Yes	.....	.....	Yes	125	.....
174	476	Yes	300	.....	Yes	None	.....
175	500	Yes	.....	.....	No	.....	6.00
176	310	Yes	.....	.....	No	.....	5.00
177	275	Yes	.....	.....	No	.....	.....
178	360	Yes	.....	.....	No	.....	5.00
179	361	Yes	.....	400	Yes	None	.....
180	500	Yes	2,000	.....	No	.....	10.00
181	500	Yes	2,000	1,800	Yes	300	.....
182	650	No	4,000	1,000	Yes	None	.....
183	500	No	.....	750	Yes	None	.....
184	630	Yes	2,000	1,000	Yes	None	.....
185	300	No	.....	.....	No	.....	8.00
186	650	No	2,000	.....	No	.....	6.00
187	600	No	2,000	1,600	Yes	None	.....
188	600	Yes	.....	.....	Yes	600	.....
189	600	Yes	2,000	250	No	.....	10.00
190	800	Yes	2,000	.....	No	.....	6.00
191	750	No	1,200	.....	Yes	None	.....
192	603	No	2,000	.....	No	.....	7.50
193	860	No	2,000	.....	No	.....	14.00
194	.....	No	2,000	500	Yes	1,000	.....
195	500	No	.....	.....	No	.....	7.50
196	685	Yes	2,000	.....	No	.....	8.50
197	900	No	2,000	1,000	Yes	1,000	.....
198	500	Yes	.....	.....	No	.....	5.00
199	625	Yes	1,000	500	No	.....	10.00
200	500	Yes	1,000	250	No	.....	10.00
201	.....	Yes	2,000	.....	No	.....	\$ 4.00
202	.....	No	2,000	.....	No	.....	.....
203	.....	Yes	1,000	.....	No	.....	10.00
204	600	.....	7,000	500	Yes	.....	.....
205	935	Yes	2,000	1,000	Yes	350	.....
206	850	Yes	2,000	500	No	.....	12.00
207	900	Yes	1,000	.....	No	.....	\$ 4.00
208	500	No	.....	500	No	.....	5.00
209	475	Yes	.....	.....	.....	.....	.....
210	705	Yes	.....	.....	No	.....	12.00
211	720	Yes	2,000	500	Yes	300	.....
212	400	No	.....	.....	No	.....	5.00
213	1,100	Yes	2,000	.....	No	.....	15.00
214	765	Yes	3,000	300	No	.....	10.00
215	660	Yes	.....	.....	No	.....	.....
216	800	.....	.....	.....	No	.....	.....
217	.....	No	.....	.....	.....	.....	.....
218	780	Yes	2,000	1,400	Yes	500	.....
219	400	No	1,000	.....	No	.....	7.00
220	1,040	Yes	.....	.....	No	.....	14.00
221	.....	Yes	3,000	.....	No	.....	8.00
222	380	No	1,000	.....	No	.....	5.00
223	676	Yes	5,000	500	No	.....	15.00

J. Percentage system.

I. Irregular hours.

N. Not employed steadily.

R. Room rent, single man.

WAGE EARNERS

Nativity, Occupation, Earnings,

Marginal number.	OCCUPATION.	Locality where employed.	Nativity.	WAGES.		Work- ing hours per day.
				Rate.	Per	
224	Printer (job).....	Sioux City.....	Wisconsin	16.00	Week ..	9
225	Printer (linotype) ..	Sioux City.....	Illinois.....	0.42	Hour ..	8
226	Reporter (newspaper) ..	Des Moines.....	Illinois.....	15.00	Week ..	i
227	Reporter (newspaper) ..	Waterloo.....	Wisconsin	12.00	Week ..	i
228	Reporter (newspaper) ..	Sioux City.....	Iowa.....	60.00	Month ..	i
229	Tailor.....	Burlington.....	Iowa.....	a 1.50	Day ..	14
230	Tailor.....	Clinton.....	Austria.....	a 15.00	Week ..	10
231	Tailor.....	Council Bluffs.....	Denmark.....	a 1.50	Day ..	10
232	Tailor.....	Davenport.....	Iowa.....	a 2.25	Day ..	i
233	Tailor.....	Ottumwa.....	Sweden.....	a 2.00	Day ..	i
234	Tailor.....	Waterloo.....	Germany.....	a 1.75	Day ..	10
235	Tailor.....	Sioux City.....	Austria.....	14.50	Week ..	10
236	Teamster.....	Boone.....	Iowa.....	1.50	Day ..	10
237	Teamster.....	Des Moines.....	Iowa.....	2.50	Day ..	10
238	Teamster.....	Ottumwa.....	Pennsylvania ..	2.50	Day ..	10
239	Telegrapher.....	Bellevue.....	Iowa.....	40.00	Month ..	d 12
240	Telegrapher (manager) ..	Cedar Rapids.....	Indiana.....	75.00	Month ..	d 9
241	Telegrapher.....	Clinton.....	Indiana.....	50.00	Month ..	d 12
242	Telegrapher.....	Council Bluffs.....	Ohio.....	50.00	Month ..	d 12
243	Telegrapher.....	Lacey.....	Ohio.....	40.00	Month ..	d 13
244	Telegrapher.....	Missouri Valley.....	Massachusetts ..	50.00	Month ..	d 12
245	Telegrapher.....	Muscatine.....	Iowa.....	45.00	Month ..	d 13
246	Telegrapher.....	New Sharon.....	Iowa.....	85.00	Month ..	d 14
247	Telegrapher.....	Union.....	Iowa.....	45.00	Month ..	d 14
248	Telegrapher.....	Waterloo.....	Iowa.....	45.00	Month ..	d 10
249	Tinner & sht. iron work'r	Davenport.....	Iowa.....	2.50	Day ..	9
250	Tinner & sht. iron work'r	Des Moines.....	Iowa.....	2.50	Day ..	9
251	Tinner & sht. iron work'r	Sioux City.....	Iowa.....	2.50	Day ..	9
252	Typewriter (inspector) ..	Des Moines.....	Iowa.....	2.25	Day ..	10
253	Typewriter (drillier) ..	Des Moines.....	Iowa.....	a 1.35	Day ..	10
254	Typewriter (alignor) ..	Des Moines.....	Canada.....	1.30	Day ..	10
255	Wagon maker.....	Burlington.....	Illinois.....	a 1.50	Day ..	10
256	Wagon maker.....	Dubuque.....	Germany.....	a 1.75	Day ..	10
257	Wagon maker.....	Grinnell.....	Iowa.....	a 1.60	Day ..	10
258	Waiter and cook.....	Des Moines.....	Iowa.....	2.00	Day ..	d 12
259	Waiter.....	Des Moines.....	Iowa.....	8.00	Week ..	d 11
260	Waiter, manager.....	Keokuk.....	Ohio.....	12.00	Week ..	d 10
261	Waiter and cook.....	Sioux City.....	Minnesota.....	43.00	Month ..	d 12
262	Woodworking machinist ..	Burlington.....	Iowa.....	1.25	Day ..	10
263	Wood worker machinist ..	Clinton.....	Indiana.....	10.00	Week ..	10
264	Wood worker machinist ..	Davenport.....	New York.....	2.00	Day ..	10
265	Wood worker machinist ..	Des Moines.....	Sweden.....	15.00	Week ..	10
266	Wood worker machinist ..	Dubuque.....	Iowa.....	1.50	Day ..	10
267	Wood worker machinist ..	Keokuk.....	Missouri.....	1.75	Day ..	10
268	Wood worker machinist ..	Muscatine.....	Pennsylvania ..	1.75	Day ..	10

a, Average daily earnings piecework

b, With board.

c, With commission.

d, Seven days a week.

e, Extra income.

OF IOWA—CONTINUED.

Hours, Insurance, Home, Etc.

MARGINAL NUMBER.	Yearly earnings.	If member of labor union	AMOUNT OF INSURANCE CARRIED.		THE HOME.		
			Life.	Fire.	Owned?	Incumbrance.	Amount rent per month.
224	800	Yes	2,000	1,000	Yes	500	
225	1,000	Yes	3,000	1,500	Yes	None	
226	700	No	2,000		No		5.00
227	624	No	2,000	1,400	Yes	800	
228	700	No	2,500	500	Yes	300	
229	470	Yes			No		4.00
230	700	Yes	1,000		No		8.00
231	480	Yes	1,000	1,300	Yes	475	
232	580	Yes			No		10.00
233	516	Yes		300	No		8.00
234	500	Yes	150	700	Yes	750	
235	725	Yes	2,000		No		11.00
236	300	No			No		
237	680	Yes		1,200	Yes	None	
238	450	Yes					6.00
239	480	No	2,000		No		
240	900	No	2,000	1,000	No		18.06
241	600	No	3,000		No		13.00
242	600	Yes		2,300	Yes	None	
243	520	Yes	500	500	Yes	None	
244	600	No	500	350	No		10.00
245	600	No	1,000		No		11.00
246	1,100	No	3,000	3,000	Yes	None	
247	540	No	2,000		No		10.00
248	700	No	6,000		No		
249	720	Yes	2,000		No		
250	700	Yes	1,000	500	Yes	300	
251	680	Yes	2,000	500	Yes	None	
252	650	No	2,000		Yes	None	
253		No			No		10.00
254	320	No			No		7.50
255	460	No		800	Yes	475	
256	500	No	1,000	500	Yes	None	
257	540	No	2,000		No		6.00
258	624	Yes	2,000	300	No		13.00
259	300	Yes			No		10.00
260	416	No	2,000		No		9.00
261	500	Yes	1,000	500	No		12.00
262	297	No	1,000		No		5.50
263	480	Yes		600	Yes	None	
264	447	No	1,000		No		9.00
265	650	Yes	2,000		No		9.00
266	420	Yes	750		No		5.50
267	436	Yes		500	Yes	100	
268	450	Yes	2,000	800	Yes	500	

f. Percentage system.

i. Irregular hours.

n. Not employed steadily.

r. Room rent, single man.

RAILROAD STATISTIC



SPECIAL RAILROAD REPORTS,

The fact that railroad companies do not keep their accounts by counties renders it necessary to use the Railroad Commissioners reports for 1899 and 1900 which is herewith given under tables number one to two, inclusive, in compliance with the law, together with a wage schedule of the different railroad shops in the state, the results of independent investigation by this bureau.

TABLE 1—RAILROAD EMPLOYES

RAILROADS.	GENERAL OFFICERS.			OTHER OFFICERS.		
	Number	Total yearly compensation.	Average daily compensation.	Number	Total yearly compensation.	Average daily compensation.
Ames & College .....	..	..	..	5	\$ 7,800 00	\$ 4.33
Atchison, Topeka & Santa Fe.....	..	..	..	76	70,714 95	2 43
Boone Valley	11	\$ 38,808.09	\$ 9.67	..	..	..
Burlington, Cedar Rapids & Northern	3	1,989 00	3.90	..	..	..
Cedar Rapids, G. & N-W	16	79,591.54	13.62	..	..	..
Chicago, Burlington & Quincy .....	..	..	..	..	..	..
Chicago, Burlington & Kansas City .....	..	..	..	..	..	..
Kansas City, St. Joe & Council Bluffs .....	..	..	..	..	..	..
St. Louis, Keokuk & Northwestern .....	..	..	..	..	..	..
Chicago, Ft. Madison & Des Moines	3	5,330.24	4.87	1	1,285.00	3.52
Chicago, Iowa & Dakota	2	1,345.00	1.85	..	..	..
Chicago Great Western .....	..	..	..	2	6,000.00	8.22
Chicago, Milwaukee & St. Paul	10	72,922.28	20.65	15	58,691.44	10.43
Chicago, Rock Island & Pacific .....	..	..	..	5	16,200.00	10.35
Chicago & North-Western .....	..	..	..	2	7,275.00	11.62
Chicago, St. Paul, Minneapolis & Omaha .....	..	..	..	..	..	..
Sioux City & Pacific	1	90.00	.29	2	540.00	.86
Crooked Creek	3	3,080.00	3.29	..	..	..
Des Moines, Northern & Western	6	8,250.00	7.47	1	900.00	4.89
Dubuque & Sioux City	10	60,690.46	10.23	..	..	..
Stacyville railroad .....	..	..	..	..	..	..
Des Moines Union	2	3,107.00	4.25	..	..	..
Iowa Central	15	34,768.14	6.36	..	..	..
Albia & Centerville .....	..	..	..	..	..	..
Iowa Northern	1	600.00	2.00	..	..	..
Keokuk & Western	6	12,034.81	5.49	7	13,500.00	5.28
Mason City & Ft. Dodge	7	5,882.50	4.03	..	..	..
Minneapolis & St. Louis	15	11,118.49	12.35	5	1,261.30	4.21
Muscatine N. & S. †	*2	1,100.00	3.22	..	..	..
Omaha & St. Louis .....	..	..	..	..	..	..
Sioux City & Northern	4	9,100.00	6.23	8	6,560.00	3.96
Tabor & Northern	1	..	..	1	1,200.00	3.83
Union Pacific .....	..	..	..	..	..	..
Wabash	1	3,316.17	14.32	..	..	..
Winona & Western	4	1,058.76	3.54	3	697.54	3.11
NARROW GAUGE ROADS.						
Burlington & Northwestern	3	2,161.40	4.61	2	916.05	2.93
Burlington & Western	3	2,458.60	5.23	2	1,033.55	3.30
Total	129	\$ 358,805.48	..	137	\$ 104,574.83	..

* Six months. † Five and one-third months.

AND SALARIES—IOWA—1899.

GEN. OFFICE CLERKS.			STATION AGENTS.			OTHER STATIONMEN.			ENGINEERS.		
Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.
			3	\$ 2,574.00	\$2.38	11	\$ 5,841.96	\$1.63	1	\$ 474.60	\$1.30
			158	92,249.50	1.87	182	77,847.12	1.37	58	69,327.00	3.70
72	45,284.75	2.01	5	1,497.50	1.75				102	130,643.00	3.80
1	297.50	1.75	129	77,086.17	1.63	336	138,324.23	1.31	1	712.50	3.75
41	45,689.61	3.05	13	7,008.00	1.37	3	349.80	.32	187	221,369.80	3.24
			8	4,110.00	1.41	1	180.00	.58	13	16,124.48	3.40
			7	2,820.00	1.19	8	3,250.00	1.12	2	1,186.00	2.75
2	1,214.49	1.67	10	5,400.00	1.48	2	840.00	1.15	2	1,956.40	2.68
2	513.22	.71	6	2,652.89	1.22				2	2,434.08	3.42
			80	54,540.00	1.86	110	55,438.00	1.38	1	832.88	2.21
90	62,184.04	2.21	271	146,561.30	1.73	843	401,518.42	1.52	85	111,600.00	3.60
			168	98,666.40	1.88	215	98,647.20	1.47	287	335,549.26	3.73
15	16,161.29	3.97	159	112,107.80	1.95	326	149,116.79	1.59	143	197,116.92	4.40
			12	9,079.33	2.42	41	22,549.00	1.76	402	433,424.25	3.57
			13	9,720.00	2.39	50	27,173.88	1.85	17	52,076.77	4.15
7	2,484.40	1.92	2	811.35	1.3				18	21,767.19	3.86
20	52,502.34	2.19	20	15,688.84	1.56				1	879.00	2.44
			96	50,617.89	1.63	115	46,143.51	1.24	9	12,170.72	4.32
			2	960.00	1.32				91	101,218.92	3.72
4	1,350.00	1.06				28	16,524.10	1.49	3	2,488.24	2.45
62	33,041.42	1.65	71	35,144.80	1.42	34	14,042.73	1.09	59	70,925.00	3.75
			2	1,200.00	1.04	2	159.96	.22			
1	580.00	2.00							1	960.00	3.20
20	9,183.18	1.45	32	15,238.70	1.37	29	12,555.68	1.35	16	16,050.49	3.41
4	2,324.00	1.59	12	6,331.01	1.45	1	280.11	.72	3	4,000.20	3.66
59	6,592.26	2.17	19	11,760.00	1.98	8	2,364.66	1.08	17	17,115.72	3.61
2	594.45	1.78	5	1,445.15	1.74	2	376.60	1.16	3	9,810.30	3.96
			16	5,096.88	1.62	12	5,111.64	1.52	9	8,289.17	3.00
151	9,327.40	2.12	14	7,937.55	1.66	18	7,064.70	1.32	6	7,294.00	3.52
			1	400.00	1.53	1		.28	1	720.00	.....
											2.30
6	4,979.66	2.64	7	4,305.47	1.85	17	8,844.27	1.63	9	11,283.63	3.99
1	99.65	1.33	3	1,641.46	1.52	1	446.49	1.29	5	1,183.02	3.67
			8	3,421.50	1.37	3	836.55	.89	2	1,884.70	3.01
6	1,334.60	1.42	14	5,341.90	1.22	3	1,182.85	1.26	4	4,464.00	3.57
1	1,499.10	1.60									
476	\$ 297,236.80	...	1,370	\$ 800,177.39	...	2,402	\$ 1,097,100.64	...	1,560	\$ 1,829,721.04	.....

TABLE 2—EMPLOYES AND

RAILROADS.	FIREMEN.			CONDUCTORS.		
	Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.
Ames & College.....				1	\$ 560.00	\$1.54
Atchison, Topeka & Santa Fe.....	58	\$ 43,322.44	\$2.23	18	19,697.64	3.38
Boone Valley.....						
Burlington, Cedar Rapids & Northern.....	110	79,162.00	2.32	76	79,770.52	1.32
Cedar Rapids, Garner & North-Western.....	1	427.50	2.25	1	510.50	3.00
Chicago, Burlington & Quincy.....	197	133,027.68	1.86	129	140,620.77	2.98
Chicago, Burlington & Kansas City.....	13	8,856.45	1.89	11	12,314.64	3.21
Kansas City, St. Joe & Council Bluffs.....	2	772.80	1.50			
St. Louis, Keokuk & North-Western.....	2	1,041.90	1.43	1	780.00	2.49
Chicago, Ft. Madison & Des Moines.....	2	1,665.50	2.34	2	1,821.40	2.68
Chicago, Iowa & Dakota.....	1	432.04	1.18	1	672.58	1.84
Chicago Great Western.....	85	68,255.00	2.20	57	60,024.25	2.86
Chicago, Milwaukee & St. Paul.....	286	202,157.38	2.26	236	260,939.15	3.54
Chicago, Rock Island & Pacific.....	141	122,888.40	2.78	105	122,531.52	3.73
Chicago & North-Western.....	449	294,733.71	2.19	265	276,720.96	2.23
Chicago, St. Paul, Minneapolis & O.....	17	13,512.89	2.54	13	13,649.24	3.36
Sioux City & Pacific.....	18	13,205.62	2.34	6	7,762.76	4.13
Crooked Creek.....	1	540.00	1.73	1	540.00	1.73
Des Moines Northern & Western.....	9	7,551.65	2.68	8	8,262.30	3.30
Dubuque & Sioux City.....	95	59,783.32	2.20	56	61,456.21	3.58
Stacyville railroad.....						
Des Moines Union.....	3	1,616.00	1.43			
Iowa Central.....	64	39,093.03	2.07	39	39,728.59	2.93
Albia & Centerville.....						
Iowa Northern.....	1	540.00	1.80	1	600.00	2.00
Keokuk & Western.....	18	10,042.20	2.09	11	10,126.12	3.08
Mason City & Ft. Dodge.....	3	2,598.16	2.35	3	2,865.44	2.48
Minneapolis & St. Louis.....	17	9,914.52	2.09	7	6,099.60	2.81
Muscatine North & South.....	3	492.28	2.17	3	635.20	2.83
Omaha & St. Louis.....	9	5,178.03	1.87	7	3,478.50	2.25
Sioux City & Northern.....	6	4,568.15	2.18	5	4,879.95	3.31
Tabor & Northern.....	1	420.00	1.34	1	420.00	1.34
Union Pacific.....						
Wabash.....	9	6,507.19	2.20	6	7,069.48	3.56
Winona & Western.....	5	652.34	2.01	3	766.34	3.31
NARROW GAUGE ROADS.						
Burlington & North-Western.....	2	1,420.35	2.28	1	804.70	2.57
Burlington & Western.....	4	2,812.40	2.25	4	3,403.00	2.72
Total.....	1,612	\$ 1,137,018.15		1,078	\$ 1,149,521.26	

AND SALARIES—IOWA—CONTINUED.

OTHER TRAINMEN.			MACHINISTS.			CARPENTERS.			OTHER SHOPMEN.		
Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.
33	\$ 20,418.36	\$2.02	57	\$ 34,005.00	\$2.55	40	\$ 18,596.40	\$2.11	276	\$ 114,994.80	\$1.61
103	100,111.73	1.93	115	71,055.00	2.46	160	92,052.45	2.05	343	155,405.70	1.46
3	1,020.00	2.00				1		2.00	3	340.00	1.75
274	165,022.69	1.64	226	143,441.35	2.02	246	154,779.05	2.01	858	405,416.45	1.51
21	14,291.40	1.83							1	600.00	1.92
2	1,320.86	2.11	9	5,442.72	1.92	1	672.00	2.15	21	11,429.88	1.74
3	2,021.54	1.89	2	1,200.15	2.12	5	2,970.60	1.90	20	9,468.60	1.51
2	1,008.72	1.39	1	791.50	2.16	2	1,102.65	1.75	5	2,475.35	1.52
138	73,912.00	1.50	33	28,123.25	2.30	92	62,460.62	1.85	152	138,700.00	2.50
304	237,122.98	2.08	97	75,533.86	2.48	187	113,245.56	1.93	559	302,399.36	1.73
192	138,433.08	2.00	31	24,493.80	2.52	146	92,252.64	2.02	424	207,185.28	1.56
518	342,689.03	2.00	204	123,826.25	1.94	271	130,087.68	2.16	619	291,583.79	1.45
30	19,457.61	2.07	55	33,923.99	1.97	40	24,746.34	1.98	7	7,779.96	3.55
15	10,519.22	2.10	86	50,659.21	1.84	117	49,073.87	1.62	202	99,934.27	1.68
			1	540.00	1.73				1	480.00	1.54
12	6,472.89	1.72				8	4,755.65	1.90	4	2,052.32	1.64
116	82,169.74	2.15	108	50,080.33	1.63	52	42,881.08	2.23	150	74,836.71	1.63
			16	9,065.42	2.47	7	3,016.00	2.08	25	7,707.42	1.36
73	47,364.09	1.93	102	33,987.20	1.91	71	32,657.28	2.02	111	46,933.80	1.62
2	960.00	1.60				7	1,030.40	2.16			
22	9,931.84	1.70	21	9,882.05	1.51	17	9,356.66	2.20	97	33,011.35	1.41
4	2,723.85	2.01	3	3,057.63	2.82	14	6,530.86	1.99	17	8,353.41	1.56
16	9,339.36	2.11	4	3,118.92	2.52	6	3,730.40	3.17	29	10,825.68	1.43
6	842.38	1.62	1	261.46	2.09				3	693.66	1.49
13	4,904.84	1.64									
11	5,401.70	2.10	6	5,229.25	2.69	10	8,223.90	2.33	66	30,614.35	1.93
12	8,285.94	2.18	10	6,391.06	1.99	6	4,186.89	2.30	24	13,021.09	1.75
6	995.03	1.66	2	252.19	2.27	10	765.89	2.05	9	987.61	1.50
1	750.85	2.40	4	3,643.45	2.91	6	4,141.45	2.21	15	7,733.80	1.66
8	4,218.50	1.68				2	1,817.10	2.90	6	2,951.15	1.57
2,022	\$ 1,311,550.23		1,194	\$718,005.04		1,521	\$871,133.42		4,048	\$ 1,988,245.79	

TABLE No. 1—RAILROAD EMPLOYEES

RAILROADS.	SECTION FOREMEN.			OTHER TRACKMEN.		
	Number.	Total yearly compensation.	Av. daily compensation.	Number.	Total yearly compensation.	Av. daily compensation.
Ames & College	1	\$ 480.00	\$1.31			\$1.31
Atchison, Topeka & Santa Fe	5	2,760.00	1.53	53	13,874.04	1.26
Boone Valley						
Burlington, Cedar Rapids & Northern	163	89,242.50	1.50	679	265,658.75	1.25
Cedar Rapids, Gar. & North-Western	9	892.50	1.50		2,295.00	
Chicago, Burlington & Quincy	178	91,802.31	1.41	772	291,473.66	1.21
Chicago, Burlington & Kansas City	15	7,200.00	1.32	62	21,274.80	1.10
Kansas City, St. Joe & Council Bluffs	12	6,204.00	1.42	65	22,021.80	1.08
St. Louis, Keokuk & North-Western	9	4,380.00	1.33	47	15,391.80	1.05
Chicago, Ft. Madison & Des Moines	10	5,520.00	1.51	30	12,215.62	1.25
Chicago, Iowa & Dakota	3	1,350.00	1.23	10	3,196.22	1.02
Chicago Great Western	73	41,016.87	1.55	480	186,525.76	1.24
Chicago, Milwaukee & St. Paul.	287	156,405.57	1.74	1,148	445,887.44	1.24
Chicago, Rock Island & Pacific	191	110,730.00	1.85	982	311,084.55	1.26
Chicago & North-Western	202	124,997.80	1.76	1,705	444,410.81	1.31
Chicago, St. Paul, Min. & Omaha.	13	7,196.25	1.77	33	13,516.66	1.31
Sioux City & Pacific	14	7,200.00	1.64	51	15,468.28	1.24
Crooked Creek	2	960.00	1.54	4	1,045.82	1.25
Des Moines, Northern & Western	25	13,500.00	1.48	99	35,932.05	1.19
Dubuque & Sioux City	100	50,259.23	1.63	550	110,291.00	1.14
Staceyville railroad	1	480.00	1.53	3	687.97	1.10
Des Moines Union	2	1,380.00	1.80	18	8,997.95	1.27
Iowa Central	61	31,271.00	1.35	378	82,735.75	1.19
Albia & Centerville	4	2,080.00	1.42	29	4,810.30	1.21
Iowa Northern	1	480.00	1.60	5	2,250.00	1.50
Keokuk & Western	34	18,719.90	1.50	181	31,357.94	1.15
Mason City & Ft. Dodge	14	6,942.58	1.39	37	10,316.04	1.13
Minneapolis & St. Louis	27	14,580.00	1.73	57	12,129.08	1.01
Muscatine North & South	4	592.10	1.21	15	1,401.86	1.21
Omaha & St. Louis	12	5,823.60	1.31	55	14,624.50	1.11
Sioux City & Northern	12	6,427.35	1.71	62	9,828.45	1.27
Tabor & Northern	1	450.00	1.44	4	1,377.20	1.10
Union Pacific						
Wabash	7	3,675.10	1.78	25	9,419.35	1.18
Winona & Western	3	1,630.00	1.51	8	2,019.99	1.25
NARROW GAUGE ROADS.						
Burlington & Northwestern	7	3,800.00	1.76	14	5,185.15	1.18
Burlington & Western	12	6,060.00	1.61	23	8,059.85	1.12
Total	1,514	\$ 826,548.66		7,684	\$ 2,416,805.44	

AND SALARIES—IOWA—CONTINUED—1899.

SWITCHMEN, FLAGMEN AND WATCHMEN.			TELEGRAPHERS, T.R.'S AND DESPATCHERS.			EMPLOYEES ACC'T FLOAT'G EQUIPM'T.			ALL OTHER EMPLOYEES AND LABORERS.		
Number.	Total yearly compensa- tion.	Av. daily com- pensation.	Number.	Total yearly compensa- tion.	Av. daily com- pensation.	Number.	Total yearly compensa- tion.	Av. daily com- pensation.	Number.	Total yearly compensa- tion.	Av. daily com- pensation.
11	\$ 9,164.16	\$2.94	7	\$ 2,791.92	\$1.59				1	\$ 210.00	\$.65
80	51,010.84	2.15	78	41,434.32	1.70				124	44,085.24	1.69
106	117,321.01	1.64	106	73,087.29					157	102,709.91	
1	660.00	2.11	3	3,060.00	2.70				224	110,839.56	1.58
2	1,200.00	1.64	3	1,159.92	1.06				5	3,402.00	2.17
3	2,020.20	2.59	2	1,140.00	1.56				8	3,435.00	1.37
18	81.12	.22	1	600.00	1.64				5	3,426.12	2.19
42	37,381.12	2.49	45	30,386.25	1.85				190	125,404.75	1.80
135	211,160.54	2.01	255	168,297.70	2.11				1,207	902,855.56	2.28
185	81,400.92	2.08	86	60,300.00	2.24				140	99,957.48	2.28
256	175,133.48	2.25	224	135,677.21	1.93				716	298,947.96	1.77
18	11,099.02	2.13	12	6,812.54	1.98				41	22,314.90	1.74
31	20,800.81	2.14	6	3,180.00	1.69	2	\$ 604.31	\$1.50	10	2,544.85	.81
			8	4,456.66	1.53				5	1,768.80	1.10
67	39,564.57	1.82	52	32,658.11	1.81				266	154,817.05	1.75
28	13,876.00	1.75	2	900.00	1.64				24	8,182.04	1.42
41	23,794.65	2.00	31	17,678.59	1.58	6	10,965.55	1.98	69	40,787.99	1.57
			1	420.00	1.14				1	465.50	1.20
10	4,767.93	1.65	21	6,495.58	1.19				7	3,646.65	1.31
			2	777.61	1.36				12	4,310.89	2.00
3	2,160.00	2.30	7	2,840.00	1.30				13	9,872.70	2.50
			1	202.50	1.80						
5	2,700.00	1.45	9	2,343.72	1.48				15	5,228.60	2.08
12	5,364.05	1.60	4	1,895.55	1.71				20	7,433.85	1.56
10	6,152.37	2.06	5	3,365.28	2.06				14	10,428.78	2.42
			1	207.59	2.78	2	1,371.30	1.84	2	274.03	1.83
2	1,352.45	2.16	2	805.60	2.57				8	4,794.75	1.91
1	571.55	1.63	2	914.40	2.92				6	2,169.25	1.16
1,260	\$ 819,645.79		975	\$ 603,978.34		10	\$ 12,941.16		3,350	\$ 1,974,344.15	

TABLE No. 1—RAILROAD EMPLOYES AND SALARIES—1899—CONTINUED.

Marginal number.	RAILROADS.	IOWA.				TOTAL, EXCLUDING GENERAL OFFICERS.			
		TOTAL, INCLUDING GENERAL OFFICERS.		TOTAL, EXCLUDING GENERAL OFFICERS.		TOTAL, INCLUDING GENERAL OFFICERS.		TOTAL, EXCLUDING GENERAL OFFICERS.	
		Number.	Total yearly compensation.	Average daily compensation.	Number.	Total yearly compensation.	Average daily compensation.	Number.	Average daily compensation.
1	Ames & College.	4	\$ 1,754.60	.....	4	\$ 1,754.60	.....	4	\$ 1,754.60
2	Atchison & Topeka & Santa Fe.	759	409,154.90	\$ 2.07	759	409,154.90	.....	759	.....
3	Boone Valley.	2,745	1,583,161.18	1.87	2,714	1,544,353.04	.....	2,714	.....
4	Burlington, Cedar Rapids & Northern.	4,115	2,388,893.11	1.75	4,099	2,369,501.57	.....	4,099	.....
5	Cedar Rapids, Garner & Northwestern.	102	95,142.60	1.72	102	95,142.60	.....	102	.....
6	Chicago, Burlington & Quincy.	125	52,571.40	1.31	125	52,571.40	.....	125	.....
7	Chicago, Burlington & Council Bluffs.	125	55,420.20	1.41	122	55,420.20	.....	122	.....
8	Kansas City, St. Joe & Northwestern.	78	45,207.14	1.69	78	45,207.14	.....	78	.....
9	St. Louis, Keokuk & Northwestern.	90	43,225.95	1.45	88	43,225.95	.....	88	.....
10	Chicago, Fort Madison & Des Moines.	1,601	1,079,857.87	1.35	1,601	1,079,857.87	.....	1,601	.....
11	Chicago, Iowa & Dakota.	6,537	4,153,888.84	2.53	6,529	4,080,488.56	.....	6,529	.....
12	Chicago, Great Western.	3,094	1,781,888.89	1.60	3,094	1,781,888.89	.....	3,094	.....
13	Chicago, Milwaukee & St. Paul.	6,333	3,362,993.81	1.90	6,333	3,362,993.81	.....	6,333	.....
14	Chicago, Northland & Pacific.	348	228,024.59	2.10	348	228,024.59	.....	348	.....
15	Chicago & North Western.	648	339,639.98	1.88	639	339,549.98	.....	639	.....
16	Chicago, St. Paul, Minneapolis & Omaha.	18	9,466.48	1.88	15	6,466.48	.....	15	.....
17	Slope Creek & Pacific.	230	124,240.28	1.72	224	115,990.28	.....	224	.....
18	Grand Creek.	1,944	1,070,000.51	1.56	1,934	1,015,310.05	.....	1,934	.....
19	Des Moines, Northern & Western.	16	78,203.57	1.81	16	78,203.57	.....	16	.....
20	Des Moines, Sioux City.	128	634,919.61	1.93	127	634,919.61	.....	127	.....
21	Shoemaker railroad.	128	78,203.57	1.81	127	78,203.57	.....	127	.....
22	Des Moines Union.	128	634,919.61	1.93	127	634,919.61	.....	127	.....
23	Des Moines Union.	128	78,203.57	1.81	127	78,203.57	.....	127	.....
24	Albia & Centerville.	40	16,166.16	1.45	40	16,166.16	.....	40	.....
25	Albia & Centerville.	40	16,166.16	1.45	40	16,166.16	.....	40	.....
26	Lowell & Western.	13	6,970.00	.....	12	6,970.00	.....	12	.....
27	Keokuk & Western.	543	284,901.17	1.67	543	284,901.17	.....	543	.....
28	Mason City & Ft. Dodge.	149	97,291.29	1.72	149	97,291.29	.....	149	.....
29	Minneapolis & St. Louis.	309	134,922.69	2.53	293	134,922.69	.....	293	.....
30	Muscatine, North & South.	50	9,791.81	1.78	48	8,681.81	.....	48	.....
31	Omaha & St. Louis.	161	63,379.48	1.78	161	63,379.48	.....	161	.....
32	St. Louis & Northern.	279	137,000.20	2.02	275	137,000.20	.....	275	.....
33	Tabor & Northern.	12	5,157.20	1.37	10	3,957.20	.....	10	.....
34	Union Pacific.	12	5,157.20	1.37	10	3,957.20	.....	10	.....

14	Wisconsin & Western	2,045 27	18,280.37	21,702.74	101,240.75	741,350.00	5,150,150.50	2.11	11,244	5,305,748.13	2.05
15	Wisconsin & Western	1,158 41	5,154.04	2,843.01	5,598.27	741,350.00	741,350.00	1.77	140	5,305,748.13	1.71
16	Burlington & Northwestern	1,412.05	11,285.70	15,518.70	13,830.90	86	45,056.35	1.81	83	45,056.35	1.76
17	Burlington & Western	4,901.95	21,157.35	.....	22,908.00	100	48,057.80	1.67	97	48,057.80	1.61
	Total	\$102,652 39	\$4,643,024.10	\$5,363,003.19	\$9,452,601.74	134,386	\$78,667,791.33	.....	123,849	\$76,753,193.80	.....

TABLE No. 5—RAILROAD EMPLOYEES AND SALARIES—IOWA—1900—CONTINUED.

Marginal number.	RAILROADS.	GENERAL OFFICERS.			OTHER OFFICERS.			GENERAL OFFICE CLERKS.		
		No.	Total yearly compensation.	Av. daily compensation.	No.	Total yearly compensation.	Av. daily compensation.	No.	Total yearly compensation.	Av. daily compensation.
1	Ames & College									
2	Atchison, Topeka & Santa Fe				1	\$ 2,100.00	\$ 5.83			
3	Boone Valley	11	\$ 40,110.13	\$ 9.99						
4	Burlington, Cedar Rapids & Northwestern		3,137.80	1.75	7	16,650.00	7.62	141	\$ 100,503.35	
5	Cedar Rapids, Garner & Northwestern	18	86,725.00	12.90				46	42,937.50	\$ 2.98
6	Chicago, Burlington & Quincy									
7	Chicago, Burlington & Kansas City									
8	Kansas City, St. Joe & Council Bluffs									
9	St. Louis, Keokuk & Northwestern	3	4,712.50	4.30	2	1,785.00	2.45	2	1,069.03	1.46
10	Chicago, Ft. Madison & Des Moines	2	1,565.00	2.14				2	595.00	.72
11	Chicago, Iowa & Dakota									
12	Chicago, Great Western									
13	Chicago, Milwaukee & St. Paul	9	71,740.07	22.75	16	6,199.80	8.49			
14	Chicago, Rock Island & Pacific				5	18,000.00	11.50	94	69,538.33	2.36
15	Chicago & North-Western				3	10,046.64	10.70	18	21,004.29	3.55
16	Chicago, St. Paul, Minneapolis & Omaha									
17	Sioux City & Pacific	1	50.00	.16	2	540.00	.86			
18	Crooked Creek	3	3,080.00	3.90						
19	Des Moines Northern & Western									
20	Dubuque & Sioux City	10	25,199.92	8.68				27	17,336.95	2.01
21	Stacyville Railroad									
22	Des Moines Union	2	3,200.00	4.38				4	57,003.60	1.23
23	Iowa Central	13	34,359.78	7.40				87		1.78
24	Albia & Centerville									
25	Iowa Northern	1	720.00	2.40						
26	Keokuk & Western	3	10,727.00	9.82						
27	Mason City & Ft. Dodge	7	5,991.21	4.69	7	11,950.00	4.72	1	150.00	2.00
28	Minneapolis & St. Louis	7	7,225.00	16.65				28	11,355.21	1.39
29	Muscatine North & South	5		7.65	15	6,397.85	7.01	4	2,418.00	1.74
30	Omaha & St. Louis							34	3,868.80	1.83
31	William & Sioux Falls							1		1.85
32	Tabor & Northern	1	1,500.00	4.79	2	1,458.40	6.53	6	1,563.37	2.33
33	Union Pacific	1	3,414.34	14.35	1	900.00	2.87			
34	Wabash	4	904.50	3.56				7	5,271.83	2.59
35	Winona & Western				3	645.20	3.07	2	161.91	1.68

TABLE No. 1—RAILROAD EMPLOYES AND SALARIES—IOWA—1900—CONTINUED.

[illegible]

Burlington & Northwestern Burlington & Western Total	8 14	4,511.11 5,499.40	1.40 1.36	3 2.504	1,113.09 1,400.75	1.21 1.49	2 1.778	2,470.70 5,390.05	3.40 3.44
	1.421	\$ 816,795.68			\$ 1,147,723.68			\$ 2,035.054	

TABLE NO. 1—RAILROAD EMPLOYEES AND SALARIES—IOWA—1900—CONTINUED.

Marginal number.	RAILROADS.	MACHINISTS.			CARPENTERS.			OTHER SHOPMEN.		
		No.	Total yearly compensation.	Average daily compensation.	No.	Total yearly compensation.	Average daily compensation.	No.	Total yearly compensation.	Average daily compensation.
1	Ames & College	38	\$ 28,818.00	\$ 2.61	30	\$ 17,823.60	\$ 2.09	274	\$ 124,512.60	\$ 1.59
2	Atchison, Topeka & Santa Fe	119	83,100.00	2.45	181	109,158.35	2.07	370	168,444.75	1.53
3	Boone Valley	172	135,747.66	2.52	350	230,764.92	2.11	927	478,867.72	1.65
4	Burlington, Cedar Rapids & Northern	4	2,933.52	2.41	1	666.00	2.00	28	666.00	1.92
5	Burlington, Cedar Rapids & Northern	2	1,847.50	2.09	1	977.10	2.20	8	5,197.68	2.01
6	Chicago, Burlington & Quincy	1	1,847.50	3.32	1	784.03	1.96	5	2,220.02	1.48
7	Chicago, Burlington & Quincy	40	34,141.46	2.35	108	74,098.00	1.80	171	155,387.50	1.01
8	Chicago, Great Western	91	66,464.75	2.40	25	108,926.97	1.88	553	293,580.23	1.80
9	Chicago, Milwaukee & St. Paul	32	24,135.84	2.61	147	92,364.88	2.05	459	211,258.14	1.56
10	Chicago, Rock Island & Pacific	194	131,779.87	2.14	379	256,199.54	2.11	721	374,138.83	1.54
11	Chicago, St. Paul, Minneapolis & Omaha	66	42,845.63	2.05	49	28,416.90	1.85	7	8,000.50	3.05
12	Chicago, St. Paul, Minneapolis & Omaha	97	57,859.91	1.80	98	54,750.06	1.70	222	110,949.53	1.72
13	Crooked Creek	1	560.00	1.80	1			1	420.00	1.35
14	Des Moines Northern & Western	128	60,099.88	1.62	111	78,779.05	2.31	249	89,285.38	1.61
15	Dubuque & Sioux City	21	10,072.25	2.55	10	4,124.62	2.18	30	10,462.16	1.29
16	Stacyville Railroad	115	4,546.70	1.90	81	45,663.90	2.05	150	71,087.77	1.53
17	Des Moines Union				8	1,008.00				
18	Iowa Central									
19	Albia & Centerville									
20	Iowa Northern									
21	Keokuk & Western	25	11,269.15	1.80	10	7,316.12	2.28	101	315.00	1.13
22	Mason City & Ft. Dodge	6	2,238.10	2.91	4	4,631.10	2.03	19	40,835.25	1.49
23	Minneapolis & St. Louis	1	4,557.72	2.37	11	6,798.00	2.37	3	9,658.99	1.53
24	Muscatine North & South			2.50					1,820.40	1.70
25	Omaha & St. Louis	3	753.57	2.82	13	8,274.72	1.93	6	3,115.58	1.41
26	Wilmar & Sioux Falls				8	1,488.59	2.40	36	4,336.31	1.81
27	Sioux City & Northern									
28	Union Pacific									
29	Wabash	11	7,176.42	1.95	6	4,578.73	2.28	25	13,747.07	1.76

No.	Winona & Western	3	1,409.23	1.49	8	1,804.49	1.35	2	1,523.95	1.75
28	Burlington & Northwestern	8	4,545.40	1.82	22	9,327.80	1.35	2	1,523.95	8.51
	Burlington & Western	13	6,661.40	1.64	30	15,064.95	1.34	1	549.00	1.75
	Total	1,600	\$ 835,645.21		8,664	\$ 2,850,968.21		1,360	\$ 910,953.49	

TABLE No. 7—RAILROAD SALARIES—IOWA—CONTINUED. 1900.

Marginal number.	RAILROADS.	TELEGRAPH OPER- ATORS.				EMPLOYEES ACCOUNT. FLOATING EMPLOYMENT.				ALL OTHER EMPLOYEES AND LABORERS.		
		Number.	Total yearly compensa- tion.	Average daily com- pensation.	Number.	Total yearly compensa- tion.	Average daily com- pensation.	Number.	Total yearly compensa- tion.	Average daily com- pensation.	Number.	Total yearly compensa- tion.
1	Ames & College.....	6	\$ 2,876 04	\$1.60	.....	.....	.....	1	\$ 240.00	\$.65	.....	.....
2	Atchison, Topeka & Santa Fe.....	.....	.....	.....	.....	.....	.....	53	22,930.02	1.91	.....	.....
3	Boone Valley.....	71	39,975.00	1.75	17	\$ 18,815.55	\$ 3.10	251	155,583.28	.....	.....	.....
4	Burlington, Cedar Rapids & Northern.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	Cedar Rapids, Garner & Northwestern.....	116	76,400.60	1.80	.....	.....	.....	491	248,389.83	1.62	.....	.....
6	Chicago, Burlington & Quincy.....	3	1,993.80	1.82	.....	.....	.....	9	5,392.44	2.15	.....	.....
7	Chicago, Burlington & Quincy City.....	3	1,099.02	1.00	.....	.....	.....	4	5,528.28	1.96	.....	.....
8	Kansas City, St. Joe & Council Bluffs.....	1	600.00	1.56	.....	.....	.....	4	2,425.80	1.64	.....	.....
9	St. Louis, Keokuk & Northwestern.....	1	.....	1.64	.....	.....	.....	3	1,422.11	1.61	.....	.....
10	Chicago, Ft. Madison & Des Moines.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	Chicago, Ft. Madison & Des Moines.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	Chicago, Great Western.....	54	36,463.50	1.85	.....	.....	.....	244	179,802.01	2.12	.....	.....
13	Chicago, Milwaukee & St. Paul.....	260	176,047.08	2.09	.....	.....	.....	1,718	1,207,549.54	2.13	.....	.....
14	Chicago, Rock Island & Pacific.....	78	53,370.00	2.09	.....	.....	.....	1,777	115,627.32	2.09	.....	.....
15	Chicago & North-Western.....	270	157,169.14	1.90	.....	.....	.....	1,640	720,601.57	1.85	.....	.....
16	Chicago, St. Paul, Minneapolis & Omaha.....	12	7,792.60	2.07	.....	.....	.....	59	32,388.76	1.75	.....	.....
17	Sioux City & Pacific.....	8	3,801.00	1.52	.....	.....	.....	.....	2,597.53	1.50	.....	.....
18	Crooked Creek.....	.....	.....	.....	.....	.....	.....	2	200.10	1.50	.....	.....
19	Davenport, Rock Island & Northwestern.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
20	Dubuque & Sioux City.....	73	47,177.52	1.76	.....	.....	.....	402	224,436.67	1.73	.....	.....
21	Stacyville Railroad.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
22	Des Moines Union.....	2	900.00	1.64	.....	.....	.....	.....	.....	.....	.....	.....
23	Iowa Central.....	39	20,620.81	1.57	.....	.....	.....	29	9,784.14	1.52	.....	.....
24	Albia & Centerville.....	1	420.00	1.15	.....	.....	.....	186	97,338.00	1.83	.....	.....
25	Iowa Northern.....	.....	.....	.....	.....	.....	.....	1	419.65	1.15	.....	.....
26	Keokuk & Western.....	24	7,553.37	1.24	.....	.....	.....	.....	3,022.36	1.85	.....	.....
27	Mason City & Ft. Dodge.....	2	7,991.33	1.81	.....	.....	.....	9	1,806.55	1.53	.....	.....
28	Minneapolis & St. Louis.....	10	3,343.16	1.16	.....	.....	.....	47	13,707.00	1.68	.....	.....
29	Muscatine North & South.....	1	.....	2.00	.....	.....	.....	.....	.....	.....	.....	.....
30	Omaha & St. Louis.....	4	2,560.45	1.88	.....	.....	.....	1	.....	.....	.....	.....
31	Willmar & Sioux Falls.....	2	352.42	1.58	.....	.....	.....	13	6,183.49	1.42	.....	.....
32	Tabor & Northern.....	.....	.....	.....	.....	.....	.....	40	4,348.00	1.86	.....	.....
33	Wabash.....	5	3,496.68	2.12	.....	.....	.....	13	9,958.91	2.33	.....	.....

Winona & Western	1	104 04	2.74	2	883 89	1.59	2	345.70	1.80
Burlington & Northwestern	2	908 35	1.45	19	.....	.....	19	6,882 60	1.83
Burlington & Western	1	1,030 30	3.29	13	.....	.....	13	7,078 55	1.74
Total	1,059	\$ 647,689 00	.....	19	\$ 10,608 84	.....	5,420	\$ 3,085,183 06	.....

36	Western & Western	181	120,345.88	2.13	180	116,931.54	2.08	8,220.04	19,350.09
36	Burlington & Northern	70	14,075.36	1.83	72	13,075.86	1.76	1,159.43	4,055.01
37	Burlington & Northern	103	55,699.75	1.5	100	53,411.83	1.46	4,844.95	20,755.80
37	Burlington & Western	122	64,401.05	1.78	119	61,795.02	1.73	5,250.75	32,235.90
	Total	37,606	\$21,363,319.45		37,550	\$21,041,011.20		\$649,775.62	\$6,216,773.46

TABLE No. 8—RAILROAD EMPLOYES AND SALARIES—IOWA—1900—CONTINUED.

Marginal number.	RAILROADS.	DISTRIBUTION.		ENTIRE LINE.					
		Maintenance of equipment.	Conducting transportation.	TOTAL, INCLUDING GENERAL OFFICERS.		TOTAL, EXCLUDING GENERAL OFFICERS.			
				No.	Total yearly compensation.	Average daily compensation.	No.	Total yearly compensation.	Average daily compensation.
1	Ames & College	\$ 171,154.20	\$ 180,005.16	4	\$ 1,823.65	2.03	4	\$ 1,823.65	1.97
2	Atchison, Topeka & Santa Fe	586,356.55	586,347.50	19,515	10,444,107.00	1.92	19,459	10,056,727.68	1.89
3	Marshalltown & Dakota	667,211.99	1,190,236.91	3,133	1,988,620.00	1.89	3,122	1,877,909.87	1.83
4	Burlington, Cedar Rapids & Northern	61,447.14	17,294.97	25,110	15,667,752.81	1.80	24,961	15,038,193.81	1.53
5	Cedar Rapids, Garner & Northwestern	12,947.32	9,991.12	1,843	185,301.58	1.82	1,834	181,051.50	1.73
6	Chicago, Burlington & Quincy	9,714.21	14,949.24	1,671	1,127,453.20	1.66	1,663	1,095,958.00	1.63
7	Kansas City, St. Joe & Council Bluffs	4,066.40	6,397.42	34	46,718.45	1.39	34	42,005.98	1.36
8	St. Louis, Keokuk & Northwestern	1,215.00	6,397.42	30	14,450.72	1.96	24	12,885.72	1.33
9	Chicago, Iowa & Dakota	297,101.29	679,588.77	3,799	2,722,971.55	2.04	3,778	2,650,051.15	1.92
10	Chicago Great Western	721,195.84	2,541,908.54	24,317	15,822,731.20	2.02	24,288	15,261,911.91	2.01
11	Chicago, Milwaukee & St. Paul	188,607.59	1,022,473.10	12,988	7,850,501.72	2.62	12,966	7,766,267.84	2.60
12	Chicago, Rock Island & Pacific	290,514.70	2,486,097.74	30,041	10,972,641.70	2.10	30,020	10,798,256.50	2.04
13	Chicago & North-Western	183,958.85	158,238.02	5,944	3,948,124.78	1.87	5,936	3,862,460.68	1.87
14	Chicago, St. Paul, Minneapolis & Omaha	500.00	3,599.68	722	400,571.00	1.89	706	395,847.04	1.58
15	Sioux City & Pacific	161,623.38	807,640.32	18	9,668.69	1.88	15	6,588.69	1.82
16	Crooked Creek	10,976.00	56,081.57	73	22,799.99	1.32	70	19,550.03	1.32
17	Davenport, Rock Island & Northwestern	216,314.00	318,412.77	3,158	1,681,452.69	1.86	3,138	1,613,795.47	1.82
18	Dubuque & Sioux City	55,712.46	97,854.19	6	2,138.45	1.32	6	2,138.45	1.32
19	Des Moines Union	13,610.77	70,361.05	186	86,134.77	1.87	184	84,932.77	1.81
20	Iowa Northern	11,708.54	35,240.77	1,901	942,597.12	1.86	1,888	905,237.34	1.83
21	Keokuk & Western	5,083.78	19,825.47	35	9,908.33	1.28	35	9,908.33	1.28
22	Keokuk & Fort Dodge	11,708.54	35,240.77	10	8,393.94	1.72	10	7,413.94	1.67
23	Keokuk & S. L.	11,708.54	35,240.77	799	313,265.83	1.45	796	302,538.74	1.65
24	Keokuk & S. L.	11,708.54	35,240.77	152	69,211.59	1.75	145	63,222.35	1.70
25	Keokuk & S. L.	11,708.54	35,240.77	1,768	898,370.02	1.93	1,701	855,876.02	1.90
26	Keokuk & S. L.	11,708.54	35,240.77	358	266,889.86	1.70	352	260,562.86	1.69
27	Keokuk & S. L.	11,708.54	35,240.77	1,536	261,946.58	1.77	1,519	260,346.01	1.81
28	Keokuk & S. L.	11,708.54	35,240.77	232	103,677.88	2.79	219	70,491.65	1.93
29	Keokuk & S. L.	11,708.54	35,240.77	11	6,460.00	2.13	9	4,060.00	2.08
30	Keokuk & S. L.	11,708.54	35,240.77	9,028	6,017,293.90	2.13	8,990	5,846,577.05	2.08
31	Keokuk & S. L.	11,708.54	35,240.77	173	79,577.05	1.77	169	74,477.05	1.70
32	Keokuk & S. L.	11,708.54	35,240.77						
33	Keokuk & S. L.	11,708.54	35,240.77						
34	Keokuk & S. L.	11,708.54	35,240.77						
35	Keokuk & S. L.	11,708.54	35,240.77						

TABLE No. 2—WAGES OF RAILROAD
RATE FOR A

Marginal number.	LOCALITY.	Black smiths.	Boiler makers.	CAR SHOP MECHANICS.				
				Coach carpenters.	Car carpenters.	Coach truckmen.	Car truckmen.	Car repairers
1	Boone	\$ 2.75	\$ 2.75	(a)	(b) \$2.30	(a)	\$ 1.60	\$ 1.60
2	Burlington	(p)						
3	Cedar Rapids	(k) 1.75		(d) 1.85	(f) 1.85	(c) 1.50	(c) 1.25	(c) 1.50
4	Clinton	(p)		(f) 1.80	(f) 1.80	1.60	1.50	1.40
5	Creston (i)	2.75	2.75	2.50	2.25	2.25	2.00	1.75
6	Des Moines	2.75	(k) 2.75	(d) 2.00	(f) 1.75	(c) 1.60	1.50	1.60
7	Davenport	(p)						
8	Dubuque	(p)						
9	Estherville	(p)						
10	Fort Dodge	2.85	2.75	(f) 1.80	1.80		(c) 1.25	(c) 1.25
11	Fort Madison	(p)						
12	Marshalltown	(p)		(d) 2.00	(d) 1.80	(f) 1.50	(c) 1.40	1.40
13	Missouri Valley	(k) 2.75	2.75	(b) 2.25	1.75	(f) 1.75	1.25	(c) 1.25
14	Oelwein	(i) 2.25	3.00	(d) 2.00	(f) 1.75	(d) 1.75	1.75	(f) 1.75
15	Ottumwa	(p)						
16	Sioux City (o)	(i) 2.50	2.85	(b) 2.00	(f) 1.50	(c) 1.25	(c) 1.25	(c) 1.25
17	Waterloo	2.85	2.85	(a)	(d) 1.90	(a)	(a)	(c) 1.35

Figures quoted in this table are the minimum rates reported in every instance higher or

a Reported, none employed.

b Maximum rate paid \$2.50 per day of ten hours.

c Maximum rate paid \$1.75 per day of ten hours.

d Maximum rate paid \$2.25 per day of ten hours.

f Maximum rate paid \$2.00 per day of ten hours.

i Maximum rate paid \$2.75 per day of ten hours.

k Maximum rate paid \$3.00 per day of ten hours.

SHOP EMPLOYEES IN IOWA.

TEN HOUR DAY.

Marginal number.	CAR SHOP MECHANICS.						Machinists	Black smiths, boiler makers and machinists helpers.
	Car inspectors.	Mill men wood machinists.	Painters.	Pattern makers	Wood turners.	Platform builders.		
1.....	\$ 1.60	(a)	(b) \$1.80	(a)	(a)	\$ 2.50	\$ 2.60	(c) \$ 1.35
2.....								
3.....	(c) 1.50	(d) 1.50	(a) 1.50	2 85	1.65	(f) 1.75	2.60	(c) 1.30
4.....	1.40	(b) 1.75	1.40	2.35	2.35		2.60	(c) 1.40
5.....	2.00	2.75	2.25	3.00	2.25	2.25	2.75	(c) 1.50
6.....	1.75	(a) 2.00	(a) 2.00	(b) 2.25	(b) 2.25	2.30	(k) 2.70	(c) 1.50
7.....								
8.....								
9.....								
10.....	(c) 1.25	(a)	(a)	(a)	(a)	(a)	(i) 2.60	(c) 1.30
11.....								
12.....	(d) 2.00	(f) 1.75	(a) 1 75	(i) 2.50	(a)	2.25	2.75	(c) 1.40
13.....	(m) 40.00	(d) 1.25	(b) 1 35	2.25	(b) 2 00	2.25	(k) 2.75	(c) 1.40
14.....	1.75	(b) 1 75	1.50	2.25	1.75	1.75	2.90	(c) 1.50
15.....								
16.....	(p) 1.75	(i) 2.00	(i) 1.50	(a)	(i) 2.00	(f) 1.50	(k) 2.85	(c) 1 50
17.....	(n) 40.00	(a)	(a) 2.00	(a)	(a)	(a)	2.85	(c) 1.30

maximum rates given under foot notes.

/ Maximum rates earned, all work done on piece work system.

m \$40.00 per month minimum, \$65.00 per month maximum.

n \$40.00 per month minimum, \$45.00 per month maximum

Overtime exceeding 10 hours per day generally paid at the rate of time and one-half.

p Overtime to car shop employees at this point paid on straight time rates.

Not reported.

REMARKS BY RAILROAD EMPLOYES

IN TRANSPORTATION SERVICE.

Two questions of importance concerning the safety and welfare of railroad employes were included in the Trade union and Wage earners schedules, the first referring to the operation of trains with two engines and known as double headers, and the second dealing with the disciplinary systems in vogue on the various railroads governing the conduct of the employes.

Replies to these questions were by no means voluminous and do not justify being placed in a table, but are added as a supplement.

To the first enquiry:

Do you work on double header trains? Are they more dangerous than single header trains? What loss of life has resulted from double header trains from your lodge or division? The various railroad employes unions reported as follows:

CONDUCTORS—Seven unions report as being employed on double header trains, when occasion requires, and one union does not. They all claim the work is far more dangerous. No loss of life to conductors is reported resulting from accidents through this method of operation.

ENGINEERS—Nine unions report running double headers and two do not. They all report the practice far more dangerous; one union saying the risks are 100 per cent. greater, and that five lives have been lost during 1900 in accidents to double headers. One union reports the practice has been stopped on their division on account of the risks being too great. A second says it is being discontinued on their division as rapidly as possible, and a third declares there should be a state law prohibiting double headers.

FIREMEN—Ten unions report their members employed on double headers. All unite in saying they are more dangerous; four

deaths have occurred from two unions, and another reports that the records are not complete but there have been several deaths, three taking place on account of double headers going through a bridge. One union wants the practice prohibited by law.

TRAINMEN—Six unions report they are employed on trains so operated; all admit they are more dangerous. One union reports having lost two members and says the practice should by all means be discontinued. Another union wants it prohibited by state law.

The second question: Are you working under the demerit system or the time losing system for offenses? Which do you prefer? and, Why?

CONDUCTORS—Eleven replied; eight of whom work under the time losing system and three work under both systems; seven prefer the demerit system because: It is more fair; employes are more careful of their record under the demerit plan; if demerit plan is conducted fairly it is preferable because time lost can never be regained; it is less humiliating. Obvious reasons: It is not so hard on innocent sufferers, such as a man's family. Two report as being in favor of the time losing system because: Have had, no experience under the demerit plan, and because a man knows at once the full seriousness of his offense. One reports having no preference; if a man's service is not satisfactory dismiss him.

ENGINEERS—Sixteen referred to the questions; four of whom work under the time losing system, nine under demerit and three under both. Fifteen prefer the demerit plan for the following reasons: The men stand a better show for fair treatment; there is no consequent loss of wages; a man's family does not suffer for his shortcomings on account of loss of income; it is more just providing the plan is conducted fairly and as originally intended. It promotes a better feeling between officials and employes; and one reports, it is perfectly immaterial which system is adopted.

FIREMEN—Eleven answered the enquiry; ten of whom work on the demerit plan and one under both systems. Ten prefer the demerit for the following reasons: No time is lost, work is steady, it is a more reasonable system, and a man will be more zealous and careful of his record. One prefers the time losing

plan because a man is more careful not to lose time; it affects him more than by simply receiving a black mark on his record.

TRAINMEN—Four referred to it; three of whom work under the time losing system and one under both systems. Three prefer the time losing plan because, it is considered better; when a man's time is served his punishment is over and there are no more black marks against him; and I have lost only five days time for offenses in five years service. One prefers the demerit plan because a man's family does not suffer as it does when an employe has to serve time.

TRADE UNIONS IN IOWA.

TRADE UNIONS IN IOWA.

Organized labor in Iowa has kept pace with the labor movement throughout the country during the last decade by attracting to its membership those of our citizens who are designated as wage earners.

The following tables show 396 recorded trade unions in Iowa. There are 42 Threshermen's Associations in the state from which no information could be obtained for reasons best known to themselves. (They should not be classed as labor unions.)

Typographical Union No. 22 of Dubuque was organized in 1858, and the records show this to be the first trade union established in the state. The first recorded division of the Brotherhood of Locomotive Engineers in the state is No. 112 of Creston, organized in 1869, and the first lodge of the Brotherhood of Locomotive Firemen No. 161 of Burlington was organized in 1875.

Cigarmakers' local No. 111 of Des Moines, the pioneer of this craft in the state, was organized in 1881.

The labor union movement grew slowly but steadily as industries were introduced in the state, showing a roster of 173 unions at the beginning of 1890, but no record of the membership has been obtainable of them at that date.

Between 1890 and 1897 thirty-nine new unions were added and since 1897 the union movement has made remarkable strides; 184 new organizations being added during the past four years.

Forty-eight (48) crafts now have organizations in eighty-eight (88) localities with a total membership of twenty-six thousand and sixty-eight, (26,068) in the state.

The movement has been successful in Iowa by pursuing a careful and reasonable course of action; many new schedules and contracts with employers have been made and renewed, reflecting great credit on all concerned.

The records of these successes should be more carefully made by the trade unions, and reported to the Bureau for compilation

in order that the public may be informed of the successful adjustments that are accomplished without strikes.

In preparing the tables of this chapter no effort has been made to show an average rate of wages, as it would be misleading and incorrect unless a complete census of all union men could be made; and such a task is beyond the facilities of the bureau with its limited force and small appropriation.

A much better system was adopted and that was to ascertain the minimum wage for each craft and which is recorded in Table No. 1 for each locality. Statements are frequently made that associations of wage earners as conducted now, tend to drag down the more skilled to a common level, and that trade unions are a hindrance to a skillful workman hindering him from securing the proportionate increase of remuneration due to such skill or ability.

In order to ascertain whether this was a fact or mere assertion special efforts have been made to ascertain the maximum rates of wages in each craft.

The figures quoted under column "Daily wages of most skilled," disproves these statements and emphatically establish the advisability of adhering to the minimum wage principle, so that protection will be afforded the varying grades of skill and ability.

In Table No. 2, minimum and maximum rates of wages are averaged for each craft together with the average working hours per day throughout the state.

In Table No. 3, the total number of unions and members in each locality are shown.

To secure the data upon which the tables are based the attached letter and blanks were sent to all the labor organizations of the state, replies being obtained from 385 locals.

Special thanks are due to the local and national secretaries who so kindly responded with statistical data, but the bureau would recommend that the various local unions select a statistician to collect and distribute facts relating to their financial, industrial, and social conditions and to whom application could be made with the assurance that information could be readily secured when requested, and so relieve the oft-times overworked secretaries.

The Commissioner wishes to acknowledge the exceptional kindness accorded the bureau by the many active union men in the several localities who secured data by personal effort after other means had failed and furnished same to him.

STATE OF IOWA.

Bureau of Labor Statistics, Des Moines.

GENTLEMEN—The Commissioner of the Bureau of Labor Statistics is directed by law (chapter 8, section 2470, revised Code of 1897) "to collect and systematize in his biennial reports statistical details relating to all departments of labor in the state, especially its relations to the commercial, social and educational conditions of the laboring classes."

Labor organizations in Iowa having for their objects the general amelioration of the conditions of toiling humanity, it is proper that a chapter in the forthcoming report be devoted to this large body of conservative citizens.

Secretaries will kindly fill out this blank as completely as possible and add under "remarks" what suggestions your associates may consider of advantage to the people at large.

Yours truly,

C. F. WENNERSTRUM, *Commissioner.*

1. Name of Organization No. of Local.....
2. Location, City County.....
3. When organized
4. Largest membership What year?.....
5. Smallest membership What year?.....
6. Present membership.....
7. Maximum hours for a day's work.....
8. Minimum rate of pay.....
9. Earnings of the most skilled.....
10. Does your organization make an annual agreement with your employers for wages and hours?.....
11. Do you insist on union men being employed only?.....
12. Does your organization resort to strikes to settle disputes?.....
13. How many strikes did you have in 1899?.....
14. Their duration
15. Cost of strike benefits in 1899.....
16. Amount of sick benefit paid.....
17. Amount funeral benefit.....
18. Dues, special assessments, etc.....
19. Has your organization a library?.....
20. Do you discuss technical and economic subjects?.....
21. Do you give lectures?..... Or engage lecturers?.....
22. How many employed in your locality at your trade?.....
23. If in the railroad service, do you work on double-header trains?.....
24. Are they more dangerous than single headers?.....
25. What loss of life has resulted from double-headers from your lodge or division?

REMARKS.

.....

.....

.....

Date Sec.....

P. O.

It will be observed that the following tables only cover questions one to eleven inclusive on blank:

Question No. 12, received a unanimous response that strikes were resorted to when all other means failed to settle disputes.

Questions Nos. 13, 14 and 15 are tabulated in detail under special chapter on strikes.

Questions Nos. 16, 17 and 18 were answered too indefinitely for tabulation, reference frequently being made to the national secretaries.

Question No. 19, relative to libraries connected with local unions, was answered in the negative, but many responded that the matter was being considered and favorable results were expected.

Questions Nos. 20 and 21, on discussion of technical and economic subjects and employment of lecturers, were answered generally in the affirmative.

Questions Nos. 22, 23, 24 and 25, relate to employment on railroads, and are compiled under separate chapter on railroad employes.

TABLE
TRADE UNIONS

Number, hours, wages

Running number.	NAME OF ORGANIZATION.	Locality.
1	Bakers and Confectioners International Journeymen	No. Burlington
2	Bakers and Confectioners International Journeymen	No. Des Moines
3	Barbers, International Union, journeymen	No. Boone
4	Barbers, International Union, journeymen	No. 110, Burlington
5	Barbers, International Union, journeymen	No. 97, Cedar Rapids
6	Barbers, International Union, journeymen	No. 236, Clinton
7	Barbers, International Union, journeymen	No. 43, Des Moines
8	Barbers, International Union, journeymen	No. Davenport
9	Barbers, International Union, journeymen	No. Keokuk
10	Barbers, International Union, journeymen	No. 19, Oskaloosa
11	Barbers, International Union, journeymen	No. Ottumwa
12	Barbers, International Union, journeymen	No. 46, Sioux City
13	Blacksmiths, International Brotherhood of	No. 182, Cedar Rapids
14	Blacksmiths, International Brotherhood of	No. 184, Des Moines
15	Blacksmiths, International Brotherhood of	No. 162, Ottumwa
16	Boiler Makers, International Brotherhood of	No. 161, Boone
17	Boiler Makers, International Brotherhood of	No. 47, Des Moines
18	Boiler Makers, International Brotherhood of	No. 212, Oelwein
19	Boiler Makers, International Brotherhood of	No. 244, Sioux City
20	Bookbinders, International Brotherhood of	No. Cedar Rapids
21	Bookbinders, International Brotherhood of	No. 71, Des Moines
22	Bookbinders, Girls' Organization	No. Des Moines
23	Bottlers, Beer and Pop Union of	No. 7464, Ottumwa
24	Brewery Workers, International Union of United	No. 98, Davenport
25	Brewery Workers, International Union of United	No. 178, Sioux City
26	Brewery Workers, International Union of United	No. Burlington

No. 1.

IN IOWA.

and regulations.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled.		
1	1901	18	12	\$ 1.25	Day...	\$ 1.75	No.....	(a)
2	1901	40	11	1.75	Day...	2.50	(a)	(a)

(a) Not reported.

3	1900	20	(c) 12	\$ 7.00	Week	\$ 2.00	No.....	30
4	1898	20	(c) 15	7.00	Week	2.15	No.....	32
5	1897	50	(c) 13	12.00	Week	3.00	Yes.....	50
6	1900	20	(c) 12	10.00	Week	2.50	Yes.....	46
7	1888	75	(c) 11	(d) .60	Perc't	.....	Yes.....	140
8	1898	38	12	10.50	Week	2.50	Yes.....	52
9	1900	14	12	10.00	Week	2.00	Yes.....	16
10	1899	22	(c) 13	9.00	Week	2.20	Yes.....	30
11	1899	38	12	10.00	Week	2.75	Yes.....	38
12	1899	53	(c) 12	(d) .60	Perc't	.....	Yes.....	55

(a) Not reported. (d) Journeymen barbers often demand 60 per cent of their earnings as wages. (c) Saturdays 17 hours.

13	1900	20	10	\$ 2.00	Day...	\$ 3.25	No.....	20
14	1901	35	(a) 9	2.00	Day...	3.50	No.....	40
15	1900	9	10	1.65	Day...	3.00	No.....	36

(a) Blacksmiths secured nine hour day May 20, 1901, with no reduction in pay and without strike.

16	1896	25	10	\$ 2.75	Day...	\$ 2.90	No.....	26
17	1899	25	(a) 9	2.50	Day...	2.90	Yes.....	25
18	1899	22	10	3.00	Day...	3.00	No.....	23
19	1900	10	10	2.85	Day...	3.00	No.....	14

(a) Secured a reduction of hours from 10 to 9 per day without strike June 1, 1901, and with no reduction in wages.

20	1898	11	9	\$ 2.00	Day...	\$ 3.00	No.....	11
21	1898	39	9	2.00	Day...	3.25	Yes.....	39
22	1900	60	9	6.00	Week.	2.00	Yes.....	60
23	1899	25	9	\$ 1.25	Day...	\$ 1.50	Yes.....	25
24	1897	50	10	\$15.00	Week.	\$ 3.00	Yes.....	50
25	1899	11	10	15.00	Week.	3.00	Yes.....	11
26	1901	28	10	2.50	Day...	2.50	Yes.....	28

TABLE No. 1—

Running number.	NAME OF ORGANIZATION.	Locality.
27	Bricklayers, International Union of America.....	No. 10, Burlington.....
28	Bricklayers, International Union of America.....	No. Boone.....
29	Bricklayers, International Union of America.....	No. Cedar Rapids.....
30	Bricklayers, International Union of America.....	No. 6, Council Bluffs.....
31	Bricklayers, International Union of America.....	No. 2, Des Moines.....
32	Bricklayers, International Union of America.....	No. 7, Muscatine.....
33	Bricklayers, International Union of America.....	No. 8, Ottumwa.....
34	Bricklayers, International Union of America.....	No. 5, Sioux City.....
35	Brickmakers, National Alliance.....	Des Moines.....
36	Brickmakers, National Alliance.....	Lehigh.....
37	Broom Makers, International.....	Burlington.....
38	Broom Makers, International.....	Davenport.....
39	Broom Makers, International.....	Des Moines.....
40	Broom Makers, International.....	Dubuque.....
41	Carmen, Brotherhood of Railroad.....	Cedar Rapids.....
42	Carmen, Brotherhood of Railroad.....	Des Moines.....
43	Carmen, Brotherhood of Railroad.....	Missouri Valley.....
44	Carmen, Brotherhood of Railroad.....	Sioux City.....
45	Carpenters and Joiners, United Brotherhood of.....	No. 315, Boone.....
46	Carpenters and Joiners, United Brotherhood of.....	No. 534, Burlington.....
47	Carpenters and Joiners, United Brotherhood of.....	No. 308, Cedar Rapids.....
48	Carpenters and Joiners, United Brotherhood of.....	No. 364, Council Bluffs.....
49	Carpenters and Joiners, United Brotherhood of.....	No. 554, Davenport.....
50	Carpenters and Joiners, United Brotherhood of.....	No. 106, Des Moines.....
51	Carpenters and Joiners, United Brotherhood of.....	No. 678, Dubuque.....
52	Carpenters and Joiners, United Brotherhood of.....	No. 284, Fort Dodge.....
53	Carpenters and Joiners, United Brotherhood of.....	No. Keokuk.....
54	Carpenters and Joiners, United Brotherhood of.....	No. 767, Ottumwa.....
55	Cigar Makers International Union of America.....	No. 72, Burlington.....
56	Cigar Makers International Union of America.....	No. 454, Cedar Rapids.....
57	Cigar Makers International Union of America.....	No. 239, Clinton.....
58	Cigar Makers International Union of America.....	No. 324, Creston.....
59	Cigar Makers International Union of America.....	No. 177, Council Bluffs.....
60	Cigar Makers International Union of America.....	No. 172, Davenport.....
61	Cigar Makers International Union of America.....	No. 111, Des Moines.....
62	Cigar Makers International Union of America.....	No. 88, Dubuque.....
63	Cigar Makers International Union of America.....	No. 181, Fort Madison.....
64	Cigar Makers International Union of America.....	No. 60, Keokuk.....
65	Cigar Makers International Union of America.....	No. 120, Muscatine.....
66	Cigar Makers International Union of America.....	No. 155, Mt. Pleasant.....
67	Cigar Makers International Union of America.....	No. 277, Oskaloosa.....
68	Cigar Makers International Union of America.....	No. 223, Ottumwa.....
69	Cigar Makers International Union of America.....	No. 150, Sioux City.....
Cigarmakers work entirely on the piece work system; prices vary with quality of goods and price of goods.		
70	Clerks' International Protective Association, Retail.....	No. 379, Albion.....
71	Clerks' International Protective Association, Retail.....	No. 389, Boone.....
72	Clerks' International Protective Association, Retail.....	No. 296, Cedar Rapids.....
73	Clerks' International Protective Association, Retail.....	No. 395, Centerville.....
74	Clerks' International Protective Association, Retail.....	No. 401, Chariton.....
75	Clerks' International Protective Association, Retail.....	No. 183, Clinton.....
76	Clerks' International Protective Association, Retail.....	No. 234, Council Bluffs.....
77	Clerks' International Protective Association, Retail.....	No. 405, Davenport.....
78	Clerks' International Protective Association, Retail.....	No. 30, Des Moines.....
79	Clerks' International Protective Association, Retail.....	No. 343, Knoxville.....
80	Clerks' International Protective Association, Retail.....	No. —, Keokuk.....

CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (per)	Daily wages of the most skilled.		
27	1891	48	9	\$ 0.45	Hour..	\$ 4.50	Yes.....	48
28	1901	50	9	0.45	Hour..	5.40	No.....	60
29	1900	31	9	0.45	Hour..	4.50	Yes.....	31
30	1899	27	8	0.50	Hour..	5.00	Yes.....	45
31	1882	110	8	0.50	Hour..	5.00	Yes.....	110
32	(a)							(a)
33	1889	21	9	3.00	Day...	4.00	Yes.....	21
34	1899	60	9	3.75	Day...	4.50	Yes.....	60

(a) Not reported.

35	1901	280	9	\$ 1.40	Day...	\$ 3.70	Yes.....	500
36	1901	50	10	1.60	Day...	2.00	No.....	60
37	1899	10	10	\$ 1.25	Day...	\$ 1.75	Yes.....	10
38	1898	9	9	1.25	Day...	1.75	Yes.....	43
39	1900	12	10	1.50	Day...	2.00	Yes.....	20
40	1899	10	10	2.00	Day...	2.50	No.....	25

41	1881	65	10	\$ 1.70	Day...	\$ 2.00	No.....	
42	1901	35	10	1.25	Day...	2.25	No.....	
43	1901	90	10	1.25	Day...	2.50	No.....	
44	1901	65	10	1.25	Day...	2.50	No.....	

45	1898	30	9	\$ 2.25	Day...	\$ 2.50	No.....	75
46	1889	93	9	2.25	Day...	3.00	Yes.....	200
47	1899	40	10	2.00	Day...	2.50	No.....	350
48	1899	86	8	2.40	Day...	3.00	Yes.....	100
49	1889	125	9	2.00	Day...	3.00	Yes.....	200
50	1898	290	8	.32½	Hour..	3.50	Yes.....	320
51	1881	40	9	2.50	Day...	3.15	Yes.....	500
52	1899	40	10	2.50	Day...	3.00	Yes.....	200
53	1901	53	10	2.25	Day...	2.50	Yes.....	53
54	1900	83	9	1.75	Day...	2.50	No.....	120

55	1880	93	8	\$ 9.00	Week	\$ 2.00	Yes.....	93
56	1900	25	8	9.00	Week	2.00	Yes.....	40
57	1885	23	8	10.00	Week	2.25	Yes.....	30
58	1900	10	8	9.00	Week	2.00	Yes.....	14
59	1882	34	8	10.00	Week	2.00	Yes.....	34
60	1885	120	8	7.00	Week	2.50	Yes.....	250
61	1881	125	8	10.00	Week	2.75	Yes.....	125
62	1880	17	8	9.00	Week	2.25	Yes.....	90
63	1886	12	8	9.00	Week	2.50	Yes.....	12
64	1880	50	8	10.00	Week	2.50	Yes.....	49
65	1882	27	8	10.00	Week	2.25	Yes.....	40
66		13	8	9.00	Week	2.00	Yes.....	13
67	1887	46	8	10.00	Week	2.50	Yes.....	60
68	1896	22	8	6.00	Week	3.00	Yes.....	250
69	1881	96	8	12.00	Week	4.00	Yes.....	96

Minimum rate in this case means, how much the slowest workman can make on the lowest.

70	1899	25	11	\$ 2.00	Week	\$ 2.50	No.....	50
71	1900	46	11	5.00	Week	2.50	No.....	125
72	1899	40	11	4.00	Week	2.50	No.....	500
73	1900	24	11	3.00	Week	2.50	No.....	60
74	1900	(a)	(a)	(a)		(a)		
75	1896	62	10	3.00	Week	4.00	Yes.....	350
76	1900	45	10½	4.00	Week	3.00	Yes.....	300
77	1900	27	10½	8.00	Week	2.50	Yes.....	600
78	1900	100	11	5.00	Week	4.00	No.....	2,000
79	(a)							(a)
80	1901	53	12	(a)		(a)	No.....	100

TABLE No. 1—

Running number.	NAME OF ORGANIZATION.	Locality.
81	Clerks' International Protective Association, Retail.....	No. 396, Lucas
82	Clerks' International Protective Association, Retail.....	No. —, Missouri Valley.....
83	Clerks' International Protective Association, Retail.....	No. 93, Muscatine
84	Clerks' International Protective Association, Retail.....	No. 277, Oskaloosa
85	Clerks' International Protective Association, Retail.....	No. 87, Ottumwa
86	Clerks' International Protective Association, Retail.....	No. 46, Sioux City.....
The retail clerks have never attempted to set a minimum rate of wages. Figures given are		
87	Coopers' International Union of North America.....	No. 57, Cedar Rapids
88	Coopers' International Union of North America.....	No. 82, Des Moines
89	Coopers' International Union of North America.....	No. 29, Dubuque (a)
90	Coopers' International Union of North America.....	No. 72, Dubuque (b)
91	Coopers' International Union of North America.....	No. —, Keokuk
92	Coopers' International Union of North America.....	No. 43, Sioux City.....
(a) Tight barrel coopers.		
(b) Slack barrel coopers.		
93	Conductors, Order of Railway.....	No. 34, Boone
94	Conductors, Order of Railway.....	No. 31, Burlington
95	Conductors, Order of Railway.....	No. 58, Cedar Rapids
96	Conductors, Order of Railway.....	No. 67, Cedar Rapids
97	Conductors, Order of Railway.....	No. 33, Clinton
98	Conductors, Order of Railway.....	No. 328, Council Bluffs.....
99	Conductors, Order of Railway.....	No. 21, Creston
100	Conductors, Order of Railway.....	No. 38, Des Moines
101	Conductors, Order of Railway.....	No. 347, Dubuque
102	Conductors, Order of Railway.....	No. 164, Eagle Grove
103	Conductors, Order of Railway.....	No. 353, Estherville
104	Conductors, Order of Railway.....	No. 93, Fort Dodge
105	Conductors, Order of Railway.....	No. 294, Lake City
106	Conductors, Order of Railway.....	No. 268, Marion
107	Conductors, Order of Railway.....	No. 4, Marshalltown
108	Conductors, Order of Railway.....	No. 22, Mason City
109	Conductors, Order of Railway.....	No. 216, Ottumwa
110	Conductors, Order of Railway.....	No. 84, Perry
111	Conductors, Order of Railway.....	No. 232, Sioux City.....
112	Conductors, Order of Railway.....	No. 361, Valley Junction.....
113	Drivers' International Union, Team.....	No. —, Boone
114	Drivers' International Union, Team.....	No. —, Burlington
115	Drivers' International Union, Team.....	No. 90, Des Moines
116	Drivers' International Union, Team.....	No. 249, Mystic
117	Drivers' International Union, Team.....	No. —, Ottumwa
118	Electrical Workers of America, National Brotherhood of...	No. 55, Des Moines
119	Electrical Workers of America, National Brotherhood of...	No. 173, Ottumwa
120	Electrical Workers of America, National Brotherhood of...	No. 47, Sioux City.....
121	Engineers, National Brotherhood of Coal Hoisting.....	No. 43, Albia
122	Engineers, National Brotherhood of Coal Hoisting.....	No. —, Boone
123	Engineers, National Brotherhood of Coal Hoisting.....	No. 40, Centerville
124	Engineers, National Brotherhood of Coal Hoisting.....	No. 45, Des Moines
125	Engineers, National Brotherhood of Coal Hoisting.....	No. —, Elhigh
126	Engineers, National Brotherhood of Coal Hoisting.....	No. 42, Lost Creek
127	Engineers, National Brotherhood of Coal Hoisting.....	No. 39, Oskaloosa
128	Engineers, National Brotherhood of Coal Hoisting.....	No. 41, What Cheer.....

CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled.		
81	(a)	..	..	..	..	..	..	(a)
82	(a)	..	..	..	..	..	..	(a)
83	1893	55	10	\$ 2.00	Week.	\$ 2.50	No	300
84	(a)	..	..	..	..	..	..	(a)
85	1880	98	10	4.00	Week.	3.66	No	98
86	1887	93	11	6.00	Week.	4.25	No	1,200

the amounts paid in localities to new help. Hours on Saturdays, 15 and 16.

(a) Not reported.

87	1899	34	10	\$12.00	Week.	(c) \$3.00	Yes	40
88	1900	14	10	.08	Barrel	(c) 2.50	Yes	18
89	1898	20	10	2.50	Day ..	(c) 3.00	Yes	20
90	1900	18	10	9.00	Week.	(c) 2.50	Yes	18
91	1900	30	10	12.00	Week.	(c) 3.00	Yes .....	..
92	1899	24	10	.30	Hour	(c) 3.00	Yes	24

(c) Piece work system prevails largely in coopers' craft.

93	1874	45	(a)	\$80.00	Month	(b)	No	(c)
94	1874	50	(a)	80.00	Month	(b)	No	100
95	(c)	70	(a)	.03	Mile ..	(b)	(c) ..	(c)
96	(c)	40	(a)	.03	Mile ..	(b)	(c) ..	(c)
97	1882	91	10	.03	Mile ..	\$ 4.00	No	125
98	(c)	20	(a)	.03	Mile ..	(b)	(c) ..	(c)
99	1878	47	(a)	90.00	Month	(b)	No	100
100	(c)	70	(a)	.03	Mile ..	(b)	(c) ..	(c)
101	1893	35	10	3.00	Day ..	4.15	Yes	60
102	(c)	75	(a)	.03	Mile ..	(b)	(c) ..	(c)
103	(c)	25	(a)	.03	Mile ..	(b)	(c) ..	(c)
104	(c)	25	(a)	.03	Mile ..	(b)	(c) ..	(c)
105	1900	25	(a)	.03	Mile ..	(b)	No	34
106	(c)	40	(a)	.03	Mile ..	(b)	(c) ..	(c)
107	(c)	41	(a)	.03	Mile ..	(b)	(c) ..	(c)
108	1881	58	10	.03	Mile ..	(b)	No	75
109	(c)	50	(a)	.03	Mile ..	(b)	(c) ..	(c)
110	(c)	35	10	.03	Mile ..	(b)	Yes	50
111	(c)	70	(a)	.03	Mile ..	(b)	(c) ..	(c)
112	(c)	35	(a)	.03	Mile ..	(b)	(c) ..	(c)

(a) Hours are irregular.

(b) Wages are uniform, at three cents per mile. Length of service usually governs the disposition of regular runs.

(c) Not reported.

113	(a)	..	..	..	..	..	..	(a)
114	1901	162	10	\$ 2.00	Day ..	\$ 2.50	No	500
115	1899	512	10	3.00	Day ..	4.00	Yes	700
116	1901	20	8	3.00	Day ..	3.00	Yes	20
117	1899	45	10	2.20	Day ..	4.00	Yes	45

(a) Not reported.

118	1897	55	10	\$ 2.25	Day ..	\$ 3.00	No	80
119	(a)	..	..	..	..	..	..	..
120	1890	42	10	10.00	Week.	3.00	Yes	50

(a) Not reported.

121	1901	30	(a) 14	\$50.00	Month	\$ 2.25	No	35
122	1901	16	(a) 14½	1.50	Night.	665.00	..	25
123	1900	20	(a) 12	50.00	Month	670.00	..	..
124	1900	24	(a) 13	50.00	Month	670.00	..	40
125	1901	10	(a) 14½	1.50	Night.	665.00	..	12
126	1900	12	(a) 12	45.00	Month	670.00	..	14
127	1900	30	(a) 12	50.00	Month	670.00	..	30
128	1900	12	(a) 14	50.00	Month	665.00	..	15

(a) Night shifts, seven days per week.

(b) Wages paid per month to highest skill, every day in month included.

TABLE No. 1—

Running number.	NAME OF ORGANIZATION.	Locality.
129	Engineers, Brotherhood of Locomotive	No. 526, Belle Plaine.
130	Engineers, Brotherhood of Locomotive	No. 6, Boone.
131	Engineers, Brotherhood of Locomotive	No. 151, Burlington.
132	Engineers, Brotherhood of Locomotive	No. 159, Cedar Rapids.
133	Engineers, Brotherhood of Locomotive	No. 125, Clinton.
134	Engineers, Brotherhood of Locomotive	No. 112, Creston.
135	Engineers, Brotherhood of Locomotive	No. 113, Des Moines.
136	Engineers, Brotherhood of Locomotive	No. 119, Dubuque.
137	Engineers, Brotherhood of Locomotive	No. 211, Eagle Grove.
138	Engineers, Brotherhood of Locomotive	No. 181, Eldon.
139	Engineers, Brotherhood of Locomotive	No. 226, Fort Dodge.
140	Engineers, Brotherhood of Locomotive	No. 391, Fort Madison.
141	Engineers, Brotherhood of Locomotive	No. 555, Lake City.
142	Engineers, Brotherhood of Locomotive	No. 538, Marion.
143	Engineers, Brotherhood of Locomotive	No. 146, Marshalltown.
144	Engineers, Brotherhood of Locomotive	No. 117, Mason City.
145	Engineers, Brotherhood of Locomotive	No. 203, Perry.
146	Engineers, Brotherhood of Locomotive	No. 131, Sanborn.
147	Engineers, Brotherhood of Locomotive	No. 82, Sioux City.
148	Engineers, Brotherhood of Locomotive	No. 490, Sioux City.
149	Engineers, Brotherhood of Locomotive	No. 184, Stuart.
150	Engineers, Brotherhood of Locomotive	No. 525, Valley Junction.
151	Engineers, Brotherhood of Locomotive	No. 56, Walsh.
152	Engineers, Brotherhood of Locomotive	No. 114, Waterloo.

153	Federal unions (mixed labor)*	No. 7146, Boone.
154	Federal unions (mixed labor)	No. —, Burlington.
155	Federal unions (mixed labor)	No. 8215, Clinton.
156	Federal unions (mixed labor)	No. 8464, Council Bluffs.
157	Federal unions (mixed labor) (d)	No. —, Davenport.
158	Federal unions (mixed labor)	No. 7217, Des Moines.
159	Federal unions (mixed labor) (b)	No. 7478, Des Moines.
160	Federal unions (mixed labor)	No. 8802, Des Moines.
161	Federal unions (mixed labor) (c)	No. 7369, Dubuque.
162	Federal unions (mixed labor) (e)	No. —, Keokuk.
163	Federal unions (mixed labor)	No. 6103, Muscatine.
164	Federal unions (mixed labor) (d)	No. 6861, Muscatine.
165	Federal unions (mixed labor)	No. 8004, Oskaloosa.
166	Federal unions (mixed labor)	No. 8227, Ottumwa.
167	Federal unions (mixed labor)	No. 7397, Sioux City.
168	Federal unions (mixed labor)	No. 7310, Walsh.
169	Federal unions (mixed labor)	No. 8572, Winterset.

* Federal labor unions are composed of skilled and unskilled wage-earners of various crafts. When 15 members of one craft are enrolled it is obligatory for them to withdraw and form a separate union of that craft; no craftsman is eligible for membership in a federal union who is not a member of the union of his craft, providing such a union exists in the locality where he resides.

(a) Not reported.

(b) Composed entirely of building laborers.

(c) Composed entirely of casket trimmers. (d) Composed entirely of button workers

(e) Composed entirely of hod carriers.

170	Firemen, Brotherhood of Locomotive	No. 311, Belle Plaine.
171	Firemen, Brotherhood of Locomotive	No. 25, Boone.
172	Firemen, Brotherhood of Locomotive	No. 161, Burlington.
173	Firemen, Brotherhood of Locomotive	No. 27, Cedar Rapids.
174	Firemen, Brotherhood of Locomotive	No. 531, Centerville.
175	Firemen, Brotherhood of Locomotive	No. 79, Cherokee.
176	Firemen, Brotherhood of Locomotive	No. 34, Clinton.
177	Firemen, Brotherhood of Locomotive	No. 102, Des Moines.
178	Firemen, Brotherhood of Locomotive	No. 106, Dubuque.

CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	Wages.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled.		
129	1900	35	(a)	\$2.75	Day	\$ 3.70	No	50
130	(c)	100	(a)	0.037	Mile	(d) .04	(c)	(a)
131	(c)	9	(a)	.03	Mile	(c)	(c)	(a)
132	(c)	88	(a)	0.037	Mile	(d) .04	(c)	(a)
133	1873	97	(a)	2.75	Day	(d) .04	No	150
134	1869	20	(a)	3.50	Day	(d) .04	No	170
135	1871	91	(a)	3.00	Day	4.50	Yes	125
136	(c)	70	(a)	.03	Mile	(d) .04	(c)	(a)
137	(c)	55	(a)	.03	Mile	(d) .04	(c)	(a)
138	(c)	30	(a)	.03	Mile	(d) .04	(c)	(a)
139	1883	67	12	2.90	Day	(d) .037	No	100
140	(c)	61	(a)	2.75	Day	(d) .037	(c)	(a)
141	1899	46	(a)	.30	Hour	(d) .04	No	60
142	(c)	28	(a)	0.037	Mile	4.50	(c)	(a)
143	1898	54	(a)	2.90	Day	(d) .04	(c)	60
144	1879	50	10	0.037	Mile	(d) .04	No	100
145	(c)	60	(a)	0.037	Mile	(d) .04	(c)	(a)
146	(c)	21	(a)	2.75	Day	(d) .037	(c)	(a)
147	(c)	71	(a)	3.00	Day	(d) .04	No	90
148	(c)	49	(a)	2.90	Day	(d) .04	No	60
149	(c)	26	(a)	0.037	Mile	(d) .037	No	40
150	1895	64	12	3.70	Day	\$ 4.75	Yes	85
151	(c)	33	(a)	2.75	Day	.036	Yes	140
152	1870	54	12	2.90	Day	3.85	No	100

(a) Irregular hours, frequently 20 and often more per day. (c) Not reported.

(d) Four cents per mile for the very heavy engines (100 miles allowed as a minimum day's work)

153	1898	250	10	\$ 1.50	Day	\$ 3.50	Yes	(a)
154	1901	162	10	1.50	Day	2.25	No	(a)
155	1900	83	10	1.15	Day	1.75	No	1500
156	(a)	100	10	1.25	Day	3.00	No	(a)
157	1901	22	10	1.25	Day	1.75	No	125
158	1898	40	10	1.50	Day	5.00	No	(a)
159	1899	100	9	2.00	Day	2.50	Yes	400
160	1900	100	10	1.50	Day	2.00	No	(a)
161	(a)							(a)
162	1901	30	10	1.75	Day	2.00	Yes	30
163	1890	400	10	1.25	Day	2.00	No	(a)
164	1893	200	10	1.35	Day	2.25	No	(a)
165	1899	50	10	1.25	Day	1.75	No	(a)
166	1899	60	10	1.25	Day	2.00	No	(a)
167	1899	82	10	1.25	Day	3.00	No	(a)
168	1898	50	10	1.25	Day	2.00	No	(a)
169	1900	42	10	1.25	Day	1.75	No	(a)

170	1886	68	(a)	\$2.25	Day	\$ 3.50	No	(c)
171	1880	145	(a)	2.25	Day	3.75	No	(c)
172	1875	18	10	1.50	Day	2.50	No	75
173	1879	92	(a)	.022	Mile	(b)	No	(c)
174	1898	30	12	.018	Mile	.02 m.	No	33
175	1898	27	(a)	.022	Mile	(b)	No	(c)
176	1879	105	(a)	.022	Mile	(b)	No	(c)
177	1882	50	(a)	40 00	Month	\$90 Mo.	Yes	50
178	1882	28	(a)	2 25	Day	(b)	No	(c)

TABLE No. 1—

Running number.	NAME OF ORGANIZATION.	Locality.
179	Firemen, Brotherhood of Locomotive	No. 322, Dubuque.....
180	Firemen, Brotherhood of Locomotive	No. 132, Eagle Grove
181	Firemen, Brotherhood of Locomotive	No. 137, Eldon.....
182	Firemen, Brotherhood of Locomotive	No. 288, Estherville.....
183	Firemen, Brotherhood of Locomotive	No. 222, Fort Dodge
184	Firemen, Brotherhood of Locomotive	No. 391, Fort Madison.....
185	Firemen, Brotherhood of Locomotive	No. 112, Lake City.....
186	Firemen, Brotherhood of Locomotive	No. 293, Marion.....
187	Firemen, Brotherhood of Locomotive	No. 125, Marshalltown.....
188	Firemen, Brotherhood of Locomotive	No. 29, Mason City.....
189	Firemen, Brotherhood of Locomotive	No. 254, Missouri Valley.....
190	Firemen, Brotherhood of Locomotive	No. 547, Oelwein.....
191	Firemen, Brotherhood of Locomotive	No. 566, Oskaloosa.....
192	Firemen, Brotherhood of Locomotive	No. 124, Perry.....
193	Firemen, Brotherhood of Locomotive	No. 190, Sanborn.....
194	Firemen, Brotherhood of Locomotive	No. 64, Sioux City.....
195	Firemen, Brotherhood of Locomotive	No. 249, Valley Junction.....
196	Firemen, Brotherhood of Locomotive	No. 30, Waterloo.....
197	Firemen, International Brotherhood of Stationary	No., Des Moines.....
198	Firemen, International Brotherhood of Stationary	No., Sioux City.....
199	Horseshoers of United States and Canada	No. 112, Cedar Rapids.....
200	Horseshoers of United States and Canada	No. 48, Des Moines.....
201	Lathers, International Union of Wood and Metal	No. 8, Des Moines.....
202	Leather Workers, United Brotherhood of	No. 53, Boone.....
203	Leather Workers, United Brotherhood of	No. 11, Davenport.....
204	Leather Workers, United Brotherhood of	No. 24, Sioux City.....
205	Leather Workers, United Brotherhood of	No. 62, Des Moines.....
206	Leather Workers, United Brotherhood of	No. 46, Waterloo.....
207	Machinists, International Association of	No. 273, Boone.....
208	Machinists, International Association of	No. 262, Cedar Rapids.....
209	Machinists, International Association of	No. 283, Clinton.....
210	Machinists, International Association of	No. 254, Des Moines.....
211	Machinists, International Association of	No. 219, Fort Madison.....
212	Machinists, International Association of	No. 171, Missouri Valley.....
213	Machinists, International Association of	No. 299, Marshalltown.....
214	Machinists, International Association of	No. 290, Oelwein.....
215	Machinists, International Association of	No. 269, Ottumwa.....
216	Machinists, International Association of	No. 178, Sioux City.....
217	Machinists, International Association of	No. 314, Waterloo.....
218	Meat Cutters and Butchers of North America.....	No. 66, Cedar Rapids.....
219	Meat Cutters and Butchers of North America.....	No. —, Ottumwa.....
220	Meat Cutters and Butchers of North America.....	No. 51, Sioux City.....

CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union Men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled		
179	1884	29	(a)	\$ 0.022	Mile ..	(b)	No	(c)
180	1880	65	(a)	0.022	Mile ..	(b)	No	80
181	1882	30	(a)	2.00	Day ..	(b)	No	(c)
182	1886	36	(a)	2.00	Day ..	2.40	No	40
183	1884	64	(a)	2.00	Day ..	(b)	No	(c)
184	1888	57	12	2.10	Day ..	\$103 mo	No	100
185	1898	50	18	0.022	Hour ..	(b)	No	100
186	1889	55	(a)	2.25	Day ..	(b)	No	(c)
187	1882	44	(a)	2.00	Day ..	90 mo.	No	(c)
188	1880	52	(a)	.20	Hour ..	(b)	No	(c)
189	1885	68	(a)	2.00	Day ..	(b)	No	(c)
190	1899	25	10	2.25	Day ..	(b)	No	75
191	1900	29	(a)	0.022	Mile ..	(b)	No	(c)
192	1882	77	(a)	2.00	Day ..	(b)	No	(c)
193	1883	10	(a)	2.00	Day ..	75 mo	No	(c)
194	1881	51	(a)	2.25	Day ..	110 mo.	No	(c)
195	1898	58	10	2.25	Day ..	85 mo.	No	70
196	1879	71	(a)	2.25	Day ..	90 mo.	No	100

(a) Not reported.

(b) Irregular hours, frequently 20 and sometimes more per day.

(c) Wage schedules are uniform: 2 cents and 2 mills per day for smaller size engines and 2 cents per mile for the larger engines. Length of service generally considered for best runs; 100 miles constitute a day's work. (c) Not reported.

197	1901	24	(a) (c) 12	\$ 1.80	Day ..	\$ 2.25	No	200
198	1899	23	(a) 12	6.00	Week.	(b) \$60	No	150

(a) Twelve hours per day, 7 days per week. (b) Wages paid per month of 30 and 31 days and 17 hours per day to stationary firemen in some large plants.

(c) Eight hours per day for stationary firemen employed at coal mines.

199	1899	20	10	\$ 2.25	Day ..	\$ 2.50	Yes	22
200	1899	12	10	2.50	Day ..	3.00	Yes	30
201	1899	31	8	\$ 2.50	Day ..	\$ 3.00	Yes	31
202	1900	20	10	\$ 1.75	Day ..	\$ 2.25	No	20
203	1898	150	10	1.50	Day ..	2.50	No	250
204	1899	20	10	1.75	Day ..	2.25	No	24
205	1900	44	10	1.50	Day ..	2.50	No	80
206	1899	18	10	2.00	Day ..	3.00	No	23
207	1890	18	10	\$ 2.00	Day ..	\$ 2.75	No	24
208	1892	75	10	2.00	Day ..	2.75	No	90
209	1899	50	10	2.00	Day ..	3.75	No	60
210	1892	65	(a) 10	2.25	Day ..	3.00	No	100
211	1900	45	10	2.25	Day ..	3.10	No	75
212	1899	40	9	2.50	Day ..	2.90	No	45
213	1900	40	10	2.25	Day ..	2.75	No	50
214	1899	45	10	.26	Hour ..	2.90	No	60
215	1900	40	10	2.25	Day ..	2.50	No	60
216	1891	16	10	2.50	Day ..	3.00	No	25
217	1897	35	10	2.50	Day ..	2.90	No	45

(a) Secured a 9-hour day June 1, 1901, in job and contract shops without strike.

218	(a)	600	11 1/2	\$ 6.00	Week	\$ 3.25	No	(a) 600
219	1901	120	10	1.40	Day ..	4.00	No	400
220	1899							

(a) No report.

TABLE No. 1—

Running number.	NAME OF ORGANIZATION	Locality.
221	Mine Workers of America, United	No. 793, Albia
222	Mine Workers of America, United	No. 242, Avery
223	Mine Workers of America, United	No. 178, Beacon
224	Mine Workers of America, United	No. 845, Berwick
225	Mine Workers of America, United	No. 869, Boonsboro
226	Mine Workers of America, United	No. 201, Brazil
227	Mine Workers of America, United	No. 69, Bussey
228	Mine Workers of America, United	No. 608, Carbondale
229	Mine Workers of America, United	No. 949, Carbondale
230	Mine Workers of America, United	No. 553, Centerville
231	Mine Workers of America, United	No. 239, Clarkdale
232	Mine Workers of America, United	No. 1120, Cleveland
233	Mine Workers of America, United	No. 1318, Coalfield
234	Mine Workers of America, United	No. 362, Coalville
235	Mine Workers of America, United	No. 56, Colfax
236	Mine Workers of America, United	No. 775, Cincinnati
237	Mine Workers of America, United	No. 595, Darbyville
238	Mine Workers of America, United	No. 55, Des Moines
239	Mine Workers of America, United	No. 384, Des Moines
240	Mine Workers of America, United	No. 1047, Des Moines
241	Mine Workers of America, United	No. 1140, Des Moines
242	Mine Workers of America, United	No. 1197, Des Moines
243	Mine Workers of America, United	No. 1119, Diamond
244	Mine Workers of America, United	No. 831, Evans
245	Mine Workers of America, United	No. 812, Exilline
246	Mine Workers of America, United	No. 534, Flagler
247	Mine Workers of America, United	No. 708, Forbush
248	Mine Workers of America, United	No. 172, Foster
249	Mine Workers of America, United	No. 1039, Frazer
250	Mine Workers of America, United	No. 1161, Frederic
251	Mine Workers of America, United	No. 60, Given
252	Mine Workers of America, United	No. 536, Hamilton
253	Mine Workers of America, United	No. 159, Harkes
254	Mine Workers of America, United	No. 1121, Hocking
255	Mine Workers of America, United	No. 692, Hickory
256	Mine Workers of America, United	No. 916, Hiteman
257	Mine Workers of America, United	No. 387, Jerome
258	Mine Workers of America, United	No. 154, Keb
259	Mine Workers of America, United	No. 903, Laddsdale
260	Mine Workers of America, United	No. 855, Lehigh
261	Mine Workers of America, United	No. 1230, Lost Creek
262	Mine Workers of America, United	No. 325, Lost Creek
263	Mine Workers of America, United	No. 799, Lucas
264	Mine Workers of America, United	No. 851, Marquisville
265	Mine Workers of America, United	No. 1308, Marquisville
266	Mine Workers of America, United	No. 439, Morgan Valley
267	Mine Workers of America, United	No. 1471, Muchakinock
268	Mine Workers of America, United	No. 634, Mystic
269	Mine Workers of America, United	No. 875, Numa
270	Mine Workers of America, United	No. 97, Oskaloosa
271	Mine Workers of America, United	No. 1265, Otley
272	Mine Workers of America, United	No. 152, Ottumwa
273	Mine Workers of America, United	No. 790, Pekay
274	Mine Workers of America, United	No. 372, Rathbun
275	Mine Workers of America, United	No. 206, Seymour
276	Mine Workers of America, United	No. 1101, Summit
277	Mine Workers of America, United	No. 841, What Cheer
278	Mine Workers of America, United	No. 885, What Cheer
279	Mine Workers of America, United	No. 517, Willard

\$1.60 per day of 8 hours is the minimum rate of pay for day labor on the outside of mines; loosa districts; \$2.04 in the Lehigh district and \$2.00 in the Centerville district.

Miners dig coal at contract prices, arranged annually, at mutual conferences held by the The industry is controlled largely by the seasons, employment is irregular, the most reli-

CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled.		
221	1898	40	8	\$ 1.60	Day...	\$ 2.25	Yes	40
222	1897	220	8	1.60	Day...	3.00	Yes	220
223	1897	330	8	2.15	Day...	4.00	Yes	350
224	1899	100	8	1.60	Day...	2.00	Yes	100
225	1899	475	8	1.70	Day...	3.00	Yes	475
226	1898	165	8	1.60	Day...	2.50	Yes	165
227	1900	56	8	2.15	Day...	3.00	Yes	56
228	1899	126	8	2.15	Day...	2.75	Yes	126
229	1899	337	8	1.60	Day...	2.50	Yes	337
230	1898	580	8	2.00	Day...	2.50	Yes	580
231	1898	50	8	1.60	Day...	2.25	Yes	50
232	1899	250	8	1.60	Day...	2.50	Yes	300
233	1899	16	8	1.60	Day...	2.25	Yes	16
234	1899	112	8	2.15	Day...	2.25	Yes	115
235	1898	237	8	2.15	Day...	2.50	Yes	237
236	1899	279	8	1.60	Day...	2.25	Yes	279
237	1899	11	8	2.15	Day...	2.25	Yes	11
238	1887	186	8	2.00	Day...	3.25	Yes	186
239	1899	42	8	2.15	Day...	3.00	Yes	42
240	1899	110	8	2.15	Day...	2.75	Yes	110
241	1899	35	8	1.60	Day...	3.00	Yes	35
242	1899	80	8	2.15	Day...	2.75	Yes	80
243	1899	34	8	1.60	Day...	2.50	Yes	34
244	1898	259	8	2.15	Day...	2.25	Yes	259
245	1898	34	8	1.60	Day...	2.25	Yes	34
246	1898	40	8	2.15	Day...	2.50	Yes	40
247	1898	62	8	1.60	Day...	2.25	Yes	62
248	1898	60	8	1.00	Day...	2.35	Yes	60
249	1900	190	8	1.60	Day...	2.50	Yes	190
250	1900	12	8	1.60	Day...	2.25	Yes	12
251	1898	112	8	1.60	Day...	2.00	Yes	112
252	1899	90	8	2.15	Day...	2.50	Yes	100
253	1898	90	8	1.60	Day...	2.00	Yes	90
254	1899	250	8	1.60	Day...	2.15	Yes	250
255	1898	77	8	1.60	Day...	2.25	Yes	77
256	1898	466	8	2.15	Day...	2.50	Yes	466
257	1898	42	8	1.60	Day...	2.25	Yes	42
258	1898	148	8	2.15	Day...	2.50	Yes	148
259	1899	85	8	1.60	Day...	2.00	Yes	85
260	1899	163	8	1.60	Day...	2.25	Yes	163
261	1899	88	8	2.15	Day...	3.00	Yes	88
262	1899	120	8	2.15	Day...	2.50	Yes	120
263	1899	125	8	1.50	Day...	2.15	Yes	125
264	1898	195	8	1.60	Day...	2.25	Yes	195
265	1899	36	8	1.60	Day...	2.25	Yes	36
266	1898	75	8	2.15	Day...	2.50	Yes	75
267	1900	520	8	2.15	Day...	5.00	Yes	520
268	1898	350	8	1.77	Day...	2.25	Yes	350
269	1899	220	8	2.15	Day...	2.50	Yes	220
270	1899	60	8	2.15	Day...	2.30	Yes	60
271	1899	27	8	1.60	Day...	2.15	Yes	20
272	1898	160	8	2.15	Day...	2.50	Yes	167
273	1898	224	8	2.15	Day...	2.50	Yes	220
274	1897	168	8	1.60	Day...	2.00	Yes	164
275	1899	230	8	2.00	Day...	2.25	Yes	238
276	1899	10	8	1.60	Day...	2.15	Yes	10
277	1897	300	8	1.60	Day...	2.50	Yes	300
278	1898	100	8	2.15	Day...	3.00	Yes	100
279	1898	50	8	2.15	Day...	2.50	Yes	50

\$2.15 is the minimum rate for day labor inside the mines in the Des Moines and Oskema miners and operators, and this arrangement has been found very satisfactory. The average that can be obtained for annual earnings is \$450.

TABLE No. 1—

Running number.	NAME OF ORGANIZATION.	Locality.
280	Molders Union of North America, Iron	No. 193, Cedar Rapids
281	Molders Union of North America, Iron	No. 118, Davenport
282	Molders Union of North America, Iron	No. 316, Des Moines
283	Molders Union of North America, Iron	No. 263, Dubuque
284	Molders Union of North America, Iron	No. 79, Keokuk
285	Molders Union of North America, Iron	No. 203, Ottumwa
286	Musicians, American Federation of	No. 79, Clinton
287	Musicians, American Federation of	No. 67, Davenport
288	Musicians, American Federation of	No. 75, Des Moines
289	Musicians, American Federation of	No. 48, Muscatine
290	Musicians, American Federation of	No. 64, Ottumwa
291	Painters, Decorators and Paper Hangers, Brotherhood of	No. 209, Burlington
292	Painters, Decorators and Paper Hangers, Brotherhood of	No. 183, Clinton
293	Painters, Decorators and Paper Hangers, Brotherhood of	No. 107, Council Bluffs
294	Painters, Decorators and Paper Hangers, Brotherhood of	No. 199, Davenport
295	Painters, Decorators and Paper Hangers, Brotherhood of	No. 246, Des Moines
296	Painters, Decorators and Paper Hangers, Brotherhood of	No. 86, Keokuk
297	Painters, Decorators and Paper Hangers, Brotherhood of	No. 168, Oskaloosa
298	Painters, Decorators and Paper Hangers, Brotherhood of	No. 136, Ottumwa
299	Painters, Decorators and Paper Hangers, Brotherhood of	No. 214, Sioux City
300	Plasterers, International Association of Operatives	No. 160, Cedar Rapids
301	Plasterers, International Association of Operatives	No. 21, Des Moines
302	Plasterers, International Association of Operatives	No. 162, Fort Madison
303	Plumbers and Steam Fitters, United Association of	No. 212, Burlington
304	Plumbers and Steam Fitters, United Association of	No. 125, Cedar Rapids
305	Plumbers and Steam Fitters, United Association of	No. 226, Clinton
306	Plumbers and Steam Fitters, United Association of	No. 33, Des Moines
307	Plumbers and Steam Fitters, United Association of	No. 66, Dubuque
308	Plumbers and Steam Fitters, United Association of	No. 177, Keokuk
309	Plumbers and Steam Fitters, United Association of	No. 183, Ottumwa
310	Plumbers and Steam Fitters, United Association of	No. 18, Sioux City
311	Printing Pressmens Union, International	No. 104, Cedar Rapids
312	Printing Pressmens Union, International	No. 86, Des Moines
313	Printing Pressmens Union, International	No. 101, Dubuque
314	Printing Pressmens Union, International	No. 96, Ottumwa
315	Printing Pressmens Union, International	No. 63, Sioux City
316	Printing Press Feeders Assistants to Pressmen	No. 46, Des Moines
317	Printing Press Feeders Assistants to Pressmen	No. 21, Sioux City
318	Railroad Telegraphers, Order of	No. 71, Oskaloosa
319	Sheet Metal and Tin Workers Union, Amalgamated	No. 90, Council Bluffs
320	Sheet Metal and Tin Workers Union, Amalgamated	No. 91, Davenport
321	Sheet Metal and Tin Workers Union, Amalgamated	No., Des Moines
322	Sheet Metal and Tin Workers Union, Amalgamated	No. 51, Sioux City
323	Stage Employees, National Alliance	No., Des Moines
324	Stage Employees, National Alliance	No. 40, Sioux City

CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (per)	Daily wages of the most skilled.		
280	1891	20	10	\$ 2.50	Day.	\$ 2.75	Yes	20
281	1898	40	10	2.50	Day	3.00	Yes	40
282	1900	43	10	2.50	Day	(a) 3.15	Yes	50
283	1899	40	10	2.25	Day	(a) 3.25	Yes	50
284	1890	16	8	2.50	Day	(a) 5.00	No	75
285	1900	26	10	2.25	Day	(a) 3.25	No	75
(a) Piece work.								
286	1900	90	(a)	\$ 0.50	Hour	(b)	Yes	115
287	1897	170	(a)	0.40	Hour	hr. 0.60	Yes	225
288	1898	75	(a)	0.50	Hour	(b)	Yes	(a)
289	(c)							
290	1897	48	(a)	2.50	Day	4.00	Yes	48
(a) Irregular employment. (b) No limit. (c) Not reported.								
291	1900	26	10	\$ 1.50	Day	\$ 2.25	Yes	50
292	1900	47	10	2.00	Day	2.50	Yes	77
293	1899	26	8	.30	Hour	(a) 3.00	Yes	50
294	1900	88	9	13.25	Week	(a) 3.00	No	125
295	1897	133	8	2.50	Day	(a) 5.50	Yes	300
296	1899	20	10	.22½	Hour	(a) 2.50	Yes	20
297	1900	20	10	.22½	Hour	(a) 5.00	Yes	50
298	1900	14	9	.22½	Hour	(a) 3.15	Yes	35
299	1899	42	9	.25	Hour	(a) 4.50	Yes	50
(a) Paper hangers, work largely on the piece work system.								
300	1899	13	8	\$ 3.00	Day	\$ 3.75	Yes	13
301	1891	15	8	3.60	Day	4.00	Yes	18
302	1899	10	10	3.00	Day	3.00	Yes	10
303	1900	18	9	\$ 3.00	Day	\$ 3.00	Yes	18
304	1900	20	9	2.75	Day	3.00	Yes	20
305	1900	11	10	2.50	Day	3.00	No	14
306	1891	40	8	3.00	Day	3.50	Yes	45
307	1891	(a)						(a)
308	1899	11	10	3.00	Day	3.00	Yes	11
309	1899	7	8	2.50	Day	3.00	Yes	7
310	1883	22	8	3.50	Day	3.50	Yes	22
(a) Not reported.								
311	1899	27	9	\$12.00	Week	\$ 2.85	Yes	27
312	1899	40	9	10.00	Week	3.50	Yes	43
313	1899	7	9	14.00	Week	3.25	Yes	10
314	1898	12	9	2.40	Day	3.50	Yes	12
315	1893	11	9	2.00	Day	5.00	Yes	11
316	1899	63	9	\$ 6.00	Week	\$ 2.00	Yes	28
317	1899	23	9	8.00	Week	2.00	Yes	28
318	1890	18	12	\$40.00	Month	\$65 mo.	No	30
319	1900	16	9	\$ 2.25	Day	\$ 3.15	Yes	16
320	1900	25	10	2.50	Day	3.50	No	30
321	1900	50	8	2.00	Day	3.50	Yes	55
322	1899	15	9	2.50	Day	3.50	No	30
323	1899	25	(a)	\$ 1.00	Night	\$40 mo.	Yes	..
324	1892	21	(a)	.25	Hour	3.25	Yes	21
(a) Hours irregular.								

TABLE No. 1—

Running number.	NAME OF ORGANIZATION.	Locality.
325	Soap Makers.....	No. Des Moines.....
326	Stereotypers and Electrotypers Union.....	No. Des Moines.....
327	Stereotypers and Electrotypers Union.....	No. 41. Sioux City
328	Street Railway Men's Union, Amalgamated.....	No. ... Burlington ...
329	Switchmen's Union of North America.....	No. 6. Council Bluffs ..
330	Switchmen's Union of North America.....	No. 60. Dubuque
331	Switchmen's Union of North America.....	No. 126. Marshalltown ..
332	Switchmen's Union of North America.....	No. 84. Oelwein
333	Tailors Union of America, journeymen.....	No. 207. Burlington.....
334	Tailors Union of America, journeymen.....	No. 230. Clinton
335	Tailors Union of America, journeymen.....	No. 231. Council Bluffs ..
336	Tailors Union of America, journeymen.....	No. 300. Davenport
337	Tailors Union of America, journeymen.....	No. 15. Des Moines, (d) ..
338	Tailors Union of America, journeymen.....	No. 72. Dubuque.....
339	Tailors Union of America, journeymen.....	No. 160. Cedar Rapids....
340	Tailors Union of America, journeymen.....	No. 177. Keokuk
341	Tailors Union of America, journeymen.....	No. 63. Ottumwa
342	Tailors Union of America, journeymen.....	No. 232. Sioux City
343	Tailors Union of America, journeymen.....	No. 42. Waterloo.....
(d) Tailors in Des Moines estimate their annual earnings at \$650.		
344	Trainmen, Brotherhood of Railroad.....	No. 212. Belle Plaine
345	Trainmen, Brotherhood of Railroad.....	No. 204. Boone.....
346	Trainmen, Brotherhood of Railroad.....	No. 26. Burlington
347	Trainmen, Brotherhood of Railroad.....	No. 56. Cedar Rapids....
348	Trainmen, Brotherhood of Railroad.....	No. 268. Chariton
349	Trainmen, Brotherhood of Railroad.....	No. 522. Cherokee
350	Trainmen, Brotherhood of Railroad.....	No. 183. Clinton
351	Trainmen, Brotherhood of Railroad.....	No. 520. Council Bluffs ..
352	Trainmen, Brotherhood of Railroad.....	No. 28. Creston
353	Trainmen, Brotherhood of Railroad.....	No. 602. Des Moines.....
354	Trainmen, Brotherhood of Railroad.....	No. 60. Dubuque.....
355	Trainmen, Brotherhood of Railroad.....	No. 581. Dubuque.....
356	Trainmen, Brotherhood of Railroad.....	No. 138. Eagle Grove....
357	Trainmen, Brotherhood of Railroad.....	No. 348. Eldon.....
358	Trainmen, Brotherhood of Railroad.....	No. 352. Estherville
359	Trainmen, Brotherhood of Railroad.....	No. 171. Fort Dodge
360	Trainmen, Brotherhood of Railroad.....	No. 515. Fort Madison ..
361	Trainmen, Brotherhood of Railroad.....	No. 567. Keokuk
362	Trainmen, Brotherhood of Railroad.....	No. 487. Lake City.....
363	Trainmen, Brotherhood of Railroad.....	No. 319. Marion
364	Trainmen, Brotherhood of Railroad.....	No. 9. Mason City.....
365	Trainmen, Brotherhood of Railroad.....	No. 104. Moulton.....
366	Trainmen, Brotherhood of Railroad.....	No. 468. Oelwein
367	Trainmen, Brotherhood of Railroad.....	No. 152. Oskaloosa.....
368	Trainmen, Brotherhood of Railroad.....	No. 12. Ottumwa
369	Trainmen, Brotherhood of Railroad.....	No. 86. Perry
370	Trainmen, Brotherhood of Railroad.....	No. 247. Sioux City
371	Trainmen, Brotherhood of Railroad.....	No. 546. Valley Junction....
372	Trainmen, Brotherhood of Railroad.....	No. 341. Waterloo.....

-CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	Wages.			Demand the employment of union men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled.		
35	1900	12	9½	\$ 1.50	Day...	\$ 3 00	Yes ...	20
36	1899	22	9	1.50	Day...	2 50	Yes	22
37	1899	11	9	2.00	Day...	3.00	Yes	11
38	1901	41	15	1.25	Day..	1.75	No	200
39	(a)							
330	(a)							
331	(a)							
332	(a)							

(a) Unable to secure any report.

333	1893	32	(a)	\$ 1.50	Day...	\$ 3.00	Yes	(b)
334	1900	26	(c) 10	15.00	Week..	(c)	Yes	30
335	1893	20	(c) 10	1.50	Day...	2.00	Yes	20
336	1900	16	(a)	.25	Hour ..	\$600 yr.	Yes	35
337	1900	40	(c) 10	2.00	Day...	3.50	Yes	200
338	1881	40	(c) 12	.25	Hour ..	(c)	Yes	45
339	1890	30	(a)	1.50	Day...	2 50	Yes	40
340	1891	28	(a)	2.00	Week..	3.00	Yes	28
341	1890	28	(a)	1.50	Day...	2.25	Yes	33
342	1896	50	(a)	2.00	Day...	3.00	Yes	85
343	1894	18	(c) 10	1.75	Day...	2.00	Yes	25

(a) Irregular working hours; (b) not known; (c) not reported. Tailors work altogether on the piece work system, and average about \$500 per year.

(c) Hours per day where tailors have secured free work shops.

344	1886	74	(a)	\$ 2.00	Day...	(b)	No	(c)
345	1887	120	12	.20	Hour ..	\$ 2.00	No	150
346	1884	34	(a)	(c)	.....	(c)	(c)	(c)
347	1885	120	12	.20	Hour ..	2.00	No	160
348	1896	16	(a)	(c)	.....	(c)	(c)	(c)
349	1893	27	(a)	2.00	Day...	2.00	No	(c)
350	1886	120	10	2.00	Day...	\$60 mo.	No	150
351	1893	45	(a)	.20	Hour ..	2 00	No	(c)
352	1884	73	(a)	(c)	.....	(c)	(c)	(c)
353	1900	30	(a)	2.00	Day...	\$60 mo.	No	(c)
354	1885	38	(a)	.02	Mile ..	(b)	No	(c)
355	1900	44	(a)	2.00	Day...	(b)	No	(c)
356	1885	100	(a)	.02	Mile ..	\$60 mo.	No	(c)
357	1890	25	(a)	(c)	.....	(c)	(c)	(c)
358	1890	25	(a)	2.00	Day...	(b)	No	(c)
359	1886	44	(a)	2.00	Hour ..	.20 p hr	No	100
360	1893	45	(a)	1.50	Day...	2.00	No	(c)
361	1898	44	12	1.50	Day...	2.00	No	100
362	1892	71	(a)	\$ 2 00	Day ..	(b)	No	(c)
363	1889	44	(a)	.02	Mile ..	(b)	No	(c)
364	1884	120	(a)	.02	Mile ..	\$60 mo.	No	125
365	1889	23	10	.02	Mile ..	.02 mi.	No	33
366	1898	21	(a)	2.00	Day ..	(b)	No	(c)
367	1895	52	(a)	(c)	.....	(c)	(c)	(c)
368	1884	62	(a)	.02	Mile ..	(b)	No	(c)
369	1885	72	(a)	.02	Mile ..	(b)	No	(c)
370	1887	90	(a)	2.00	Day ..	\$75 mo.	No	(c)
371	1894	54	(a)	2.00	Day ..	65 mo.	No	(c)
372	1888	95	10	.02	Mile ..	90 mo.	No	200

(a) Irregular working hours, ranging from 10 to 24 per day.

(b) Length of service rather than skill governs the maximum earnings. Train men who are assigned to long, regular runs, and of necessity are the most regularly employed, make as high as \$90.00 per month. Two cents per mile is the uniform rate.

(c) Not reported.

TABLE NO. 1

Running number.	NAME OF ORGANIZATION.	Locality.
373	Typographical Union, International	No. 376, Albia.....
374	Typographical Union, International	No. 381, Boone.....
375	Typographical Union, International	No. 75, Burlington.....
376	Typographical Union, International	No. 192, Cedar Rapids.....
377	Typographical Union, International	No. 334, Clinton.....
378	Typographical Union, International	No. 203, Council Bluffs.....
379	Typographical Union, International	No. —, Davenport.....
380	Typographical Union, International	No. 118, Des Moines.....
381	Typographical Union, International	No. 22, Dubuque.....
382	Typographical Union, International	No. 68, Keokuk.....
383	Typographical Union, International	No. 394, Mason City.....
384	Typographical Union, International	No. 251, Muscatine.....
385	Typographical Union, International	No. 385, Oskaloosa.....
386	Typographical Union, International	No. 73, Ottumwa.....
387	Typographical Union, International	No. 180, Sioux City.....
388	Typographical Union, International	No. 349, Waterloo.....
389	Waiters, Cook and Bartenders International Union.....	No. 223, Des Moines ..
390	Waiters, Cook and Bartenders International Union.....	Oskaloosa
391	Waiters, Cook and Bartenders International Union.	(d) Ottumwa
392	Waiters, Cook and Bartenders International Union.	Sioux City....
(d) Bartenders only.		
393	Woodworkers, Amalgamated International Union of.....	No. 92, Clinton...
394	Woodworkers, Amalgamated Int. Millmen's Union of.....	No. 425, Des Moines
395	Woodworkers, Amalgamated International Union of.....	No. 64, Dubuque
396	Woodworkers, Amalgamated International Union of.....	No. 71, Muscatine

-CONTINUED.

RUNNING NUMBER.	Year organized.	Number of members.	Maximum working hours per day.	WAGES.			Demand the employment of union Men only.	Total number in locality working at trade.
				Minimum rate.	Unit (Per)	Daily wages of the most skilled		
373	1900	15	10	\$ 9.00	Week.	\$ 2.25	Yes	30
374	1900	18	10	(f)	Day	2.00	Yes	22
375	1885	30	(a) 8 (b) 9	(e) .24	Hour	(c) 3.00	Yes	45
376	1900	45	9	2.00	Day	3.00	Yes	45
377	1899	30	(a) 8 (b) 10	2.00	Day	(c) 2.50	Yes	40
378	1882	24	9	2.50	Day	(c) 3.50	Yes	28
379	1880	41	9	2.75	Day	2.75	Yes	81
380	1868	220	9	(e) 2.60	Day	(e) 3.30	Yes	260
381	1846	40	9	14.00	Week.	3.25	Yes	55
382	1882	18	9	2.00	Day	3.00	Yes	18
383	1900	12	10	(f)	Day	(f)	Yes	(f)
384	1893	23	9	2.00	Day	2.75	Yes	21
385	1900	20	10	(a) 6.00	Week.	2.50	No	27
386	1884	24	9	13.50	Week.	3.00	Yes	24
387	1879	75	(a) 8 (b) 9	(e) 16.75	Week.	(e) 3.50	Yes	100
388	1899	20	10	10.00	Week.	(c) 3.00	No	40

(a) Linotype machine compositors maximum working hours, 8 per day. Secured without strikes.

(b) Hand and job work compositors maximum working hours, 9 per day. Secured without strikes.

(c) Wages as quoted refers to union members; non-union compositors work 10 hours per day and receive \$3.00 to \$6.00 per week.

(d) Wages are not paid promptly nor regularly; and are frequently paid in orders for merchandise not the equivalent in cash, constituting a serious grievance.

(e) Wage scale increased by mutual conference between employer and employees and without strikes.

(f) Not reported.

389	1900	70	(a) 11	(c) 9.00	Week.	\$ 2.25	Yes	(b)
390	(e)	...	...	...	...	...	...	(e)
391	1899	38	10	10.00	Week.	3.66	Yes	38
392	1899	60	(a) 12	9.00	Week.	3.00	No	(b)

(a) Number of hours per day, 7 days per week.

(b) Not known.

(c) Wages for male waiters with board; female waiters, \$6.00 per week, with board; previous to organization hours were 12 and 13½ per day, male waiters received \$5.00 and \$6.00 per week and female waiters \$2.00, \$3.00 and \$4.00 per week, with board.

(d) Unable to secure any report.

393	1899	160	10	\$ 1.35	Day	(d) 2.50	No	500
394	1900	60	(a) 10	13.50	Week.	2.75	Yes	80
395	1899	103	(b) 9 (c) 10	1.75	Day	(d) 2.50	No	700
396	1897	16	10	1.00	Day	(d) 2.25	No	300

(a) This union decreased the working hours per day from 10 to 9 by mutual agreement with employers without a strike.

(b) Nine hours a day in winter.

(c) Ten hours a day in summer.

(d) A very small proportion of employees are enabled to make these maximum rates.

TRADE UNIONS IN IOWA.

TABLE No. 2.

Summary of the different crafts showing total number of unions reported, total membership, average wage rates, and average length of workday.

LOCAL UNIONS OF	Total number of unions.	Number reported.	Total membership.	Average min. wage per day.		Average min. wage per day.		Average length of work day.
				\$	¢	\$	¢	
Bakers and Confectioners International, Journeymen.....	2	2	58	1.25		1.87		12
Barbers International Union, Journeymen.....	10	10	350	1.57		2.39		(a) 12.50
Blacksmiths International, Brotherhood of.....	3	3	64	1.88		3.25		9.66
Boiler Makers and Iron Ship Builders, Brotherhood of.....	4	4	82	2.78		2.95		9.75
Book Binders, International Brotherhood of.....	3	3	110	2.00		3.12		9
Bottlers, Beer and Pop Union of.....	1	1	25	1.25		1.50		9
Brewery Workers, International Union of United.....	3	3	89	2.50		2.83		10
Bricklayers, International Union of.....	3	3	347	3.85		4.70		8.75
Brickmakers, International Alliance.....	2	2	330	1.50		2.50		9.50
Broom Makers, International.....	4	4	41	1.50		2.00		9.75
Car Men, Brotherhood of Railroad.....	4	4	255	1.26		2.31		10
Carpenters and Joiners of America, United Brotherhood of.....	10	10	880	2.27		2.86		9.10
Cigar Makers, International Union of America.....	15	15	713	1.54		2.44		8
Clerks International Protective Association, Retail.....	17	12	648	1.70		3.68		(b) 12
Coopers International Union of America.....	6	6	140	2.40		2.83		10
Conductors, Order of Railway.....	20	20	947	3.00		4.75		(c).....
Drivers, International Union of Team.....	5	4	739	2.55		3.37		9.50
Electrical Workers of America, National Brotherhood of.....	3	2	154	1.95		3.00		10
Engineers, National Brotherhood of Coal Hoisting.....	17	16	1,268	1.52		2.25		(d) 13.25
Engineers, Brotherhood of Locomotive.....	24	27	1,771	1.39		2.40		(e).....
Federal Labor Unions, (mixed crafts).....	27	27	1,434	2.00		2.12		(f).....
Firemen, Brotherhood of Locomotive.....	2	2	57	1.40		2.75		10
Horse Shoers of United States and Canada, International Union of.....	2	2	34	2.37		3.00		8
Leathers, International Union of Wood and Metal.....	1	1	31	2.50		2.50		10
Leather Workers on Horse Goods, United Brotherhood of.....	5	5	252	1.70		2.90		10
Machinists, International Association of.....	11	11	469	2.28		3.02		10.75
Meat Cutters and Butcher Workmen of North America.....	3	2	780	1.25		3.02		8
Mine Workers of America, United.....	59	59	9,109	(k) 1.60		2.68		9.66
Molders Union of North America, Iron.....	6	6	185	2.42		3.40		(c).....
Musicians, American Federation of.....	5	4	383	(l).....		3.50		9.25
Painters, Decorators, and Paper Hangers, Brotherhood of.....	9	9	416	2.16		3.20		8.66
Plasterers, International Operative Association of.....	3	3	38	2.89		3.15		9
Plumbers, Gas and Steam Fitters, United Association of.....	7	7	199	2.07		3.63		9
Printing Pressmen Union, International.....	5	5	97	2.07		3.63		9

TRADES UNIONS IN IOWA.

TABLE No. 3.

Summary of unions in different localities.

LOCALITY.	Number of unions.	Number of members	LOCALITY.	Number of unions.	Number of members
Albia	4	110	Jerome	1	42
Avery	1	220	Keb	1	148
Beacon	1	330	Keokuk	12	367
Belle Plaine	3	175	Knoxville	1	(a)
Berwick	1	100	Laddsdale	1	85
Boone	(a) 15	903	Lake City	4	102
Boonsboro	1	475	Lehigh	3	223
Burlington	18	895	Lost Creek	3	220
Bussey	1	66	Lucas	(a) 2	125
Brazil	1	165	Marion	4	167
Carbondale	2	463	Marquessville	2	231
Cedar Rapids	(a) 23	976	Marshalltown	(a) 5	179
Centerville	4	654	Mason City	5	202
Chariton	(a) 2	16	Missouri Valley	(a) 5	198
Cherokee	2	54	Morgan Valley	1	75
Cincinnati	1	279	Moulton	1	23
Clarkdale	1	50	Mt. Pleasant	1	13
Cleveland	1	250	Muchakinock	1	520
Clinton	15	1,015	Muscataine	(b) 8	701
Coalfield	1	16	Mystic	2	370
Coalville	1	112	Numa	1	220
Colfax	1	237	Oelwein	(a) 5	113
Council Bluffs	(a) 12	443	Oskaloosa	(a) 11	353
Creston	4	150	Otley	1	27
Darbyville	1	11	Ottumwa	(a) 23	1,510
Davenport	14	921	Pekay	1	224
Des Moines	49	3,859	Perry	4	244
Diamond	1	34	Rathbun	1	168
Dubuque	(b) 19	579	Sanborn	2	31
Eagle Grove	4	304	Seymour	1	230
Eldon	3	85	Sioux City	29	1,372
Estherville	3	105	Stuart	1	26
Evans	1	259	Summit	1	10
Exline	1	34	Valley Junction	4	211
Flagler	1	40	Walsh	2	83
Forbush	1	62	Waterloo	7	311
Fort Dodge	5	246	What Cheer	3	412
Fort Madison	6	230	Willard	1	50
Foster	1	60	Winterset	1	42
Fraser	1	190	Total	396	26,068
Frederick	1	12			
Given	1	112			
Hamilton	1	90			
Harkes	1	90			
Hickory	1	77			
Hittman	1	466			
Hocking	1	250			

(a) One union not reported.

(b) Two unions not reported.

TABLE No. 5.

Summary showing number of members of labor organizations by Counties in Iowa in 1900.

COUNTIES.		COUNTIES.		COUNTIES.		COUNTIES.	
Adair.....		Davis.....	85	Jefferson.....		Pocahontas.....	
Adams.....		Decatur.....		Johnson.....		Polk.....	4864
Allamakee.....		Delaware.....		Jones.....		Pottawattamie.....	443
Appanoose.....	2285	Des Moines.....	895	Keokuk.....	412	Poweshiek.....	
Audubon.....		Dickinson.....		Kossuth.....		Ringgold.....	
Benton.....	175	Dubuque.....	579	Lee.....	597	Sac.....	
Black Hawk.....	317	Emmett.....	105	Linn.....	1143	Scott.....	921
Boone.....	1568	Fayette.....	113	Louisa.....		Shelby.....	
Bremer.....		Floyd.....		Lucas.....	391	Sioux.....	
Buchanan.....		Franklin.....		Lyon.....		Story.....	10
Buena Vista.....		Fremont.....		Madison.....	42	Tama.....	
Butler.....		Greene.....		Mahaska.....	2018	Taylor.....	
Calhoun.....	192	Grundy.....		Marion.....	288	Union.....	150
Carroll.....		Guthrie.....	26	Marshall.....	179	Van Buren.....	
Cass.....		Hamilton.....		Mills.....		Wapello.....	1793
Cedar.....		Hancock.....		Mitchell.....		Warren.....	
Cerro Gordo.....	292	Hardin.....		Monona.....		Washington.....	
Cherokee.....	54	Harrison.....	198	Monroe.....	1211	Wayne.....	230
Chickasaw.....		Henry.....	13	Montgomery.....		Webster.....	581
Clarke.....		Howard.....		Muscatine.....	701	Winnebago.....	
Clay.....		Humboldt.....		O'Brien.....	31	Winneshiek.....	
Clayton.....		Ida.....		Osceola.....		Woodbury.....	1372
Clinton.....	1015	Iowa.....		Page.....		Worth.....	
Crawford.....		Jackson.....		Palo Alto.....		Wright.....	364
Dallas.....	244	Jasper.....	237	Plymouth.....			
Total number of members.....							26668

SUGGESTED LEGISLATION AND REMARKS
BY TRADE UNIONS.

BARBERS UNION, No. 236—Clinton.

Want laws enacted to license barbers, restrict child-labor and a state eight-hour law.

BARBERS UNION, No. 43—Des Moines.

We have organized largely for educational purposes, and to arouse the laboring classes to study their interests. We favor voluntary arbitration to settle disputes between employers and employes before strikes are engaged in.

CARPENTERS UNION, No. 106—Des Moines.

We desire a law whereby mechanics' wages will be a first lien on all construction work, and a state law making eight hours a maximum day's work.

CIGARMAKERS UNION, No. 239—Clinton.

What we want is compulsory education, restriction of child-labor, free school books, and abolition of convict contract labor.

RETAIL CLERKS UNION, No. 46—Sioux City.

This union urgently desires a rigid Sunday observance law, and have attempted to enforce the present law with five prosecutions, four under the state laws and one under the city ordinance, the city ordinance was declared unconstitutional by the courts, all the cases however were settled afterward out of court in favor of the union's position for Sunday observance.

COOPERS UNION, Nos. 29 AND 72—Dubuque.

Members of these unions are opposed to convict contract labor, and are in favor of a compulsory educational law.

COAL HOISTING ENGINEERS UNION—Of the State.

The chief purposes of our organization are educational, and thereby improve the quality of our members skill, establish uniform hours and schedules of wages, secure employment for those of our craft who are unemployed and restrict the patronage of private commercial employment agencies.

STATIONARY FIREMENS UNION—Sioux City.

This union pleads for legislative investigation, showing the conditions under which stationary firemen are working, at present over work, long hours, continuous duty, Sundays included, with great care and undue responsibility, coupled with lack of sufficient knowledge in many cases constitute serious risks to life and property.

An act of the legislature regulating conditions under which stationary firemen are employed is an immediate necessity.

MACHINISTS UNION, No. 254—Des Moines.

Sufficient authority should be granted officials of Bureau of Labor Statistics to correct factory evils, many of which exist and which are a menace to life and health.

UNITED MINE WORKERS UNION, No. 372—Rathbun.

These enquiries are filled out to the best of our knowledge and ability, it is the first time we ever had to contend with anything of the kind, we think it is a good thing though, please send us a report when issued.

UNITED MINE WORKERS UNION, No. 325—Lost Creek.

We need a library for our men while they are not at work, please send us some reports and books. (*Such requests have been numerous, and compliance to the fullest extent of the bureau's resources have always been made.—Com.*)

UNITED MINE WORKERS UNION, 172—Foster.

We recommend the election of mine inspectors by popular vote, and we ask the legislature to enact a law making it obligatory to engage fire bosses in all mines, for the safety of the miners.

UNITED MINE WORKERS, No. 392—Coalville.

It would be a great benefit and protection to the Gypsum miners to have the Gypsum mines included under the mining laws of the state; the work is more dangerous in gypsum mines than in coal mines, the industry is expanding and the employees need protection.

UNITED MINE WORKERS, No. 1120—Cleveland.

The law should be changed regulating the age of boys who are employed in mines, it should be under 14 years of age instead of 12, as it now reads. Make it compulsory that boys shall attend school until they are fourteen.

UNITED MINE WORKERS, No. 869—Boonsboro.

Our agreement for 1900 gives us \$1.00 per ton for mining in this sub-district, but many of our men do not make a dollar a day, we believe the state should own and operate the mines.

IRON MOULDERS UNION, No. 203—Ottumwa.

Our organization believes that the solution of the labor question is the most important of any before the people. Sanitary conditions in factories and the safety of the employees should be governed by the state.

PAINTERS AND DECORATORS UNION, No. 83—Keokuk.

A legal apprenticeship making it mandatory to indenture apprentices for protection to the boys and journeymen is very desirable.

STAGE EMPLOYEES UNION, No. 40—Sioux City.

Sand bags which are now used for adjusting theatrical scenery is an extremely dangerous practice and should be prohibited by law.

CLINTON TYPOGRAPHICAL UNION, No. 330—

This Union favors compulsory education, a state eight-hour law, the abolition of convict contract labor, and the Allied printing trades union label impressed on all state printing.

TAILOR'S UNION, No. 300—Davenport.

We demand from our employers strict Sunday observance, and free work rooms supplied by employers in order to prevent sweat shops.

SIoux CITY TYPOGRAPHICAL UNION, No. 180.

Our membership has decreased 40 per cent in the last few years, due to the introduction of labor-saving machinery.

WATERLOO TYPOGRAPHICAL UNION, No. 349.

Educate the public to demand the union label on all goods they purchase it would better the condition of the laboring classes without strikes.

WOODWORKERS UNION, No. 92—Clinton.

We want a child labor law with sixteen years as the minimum, compulsory education and a state eight-hour law.

WOODWORKERS UNION, No. 425—Des Moines.

Employers should be required to furnish shops that are clean and light, the machines should be more amply protected for the safety of the workmen, and, heat should be furnished in the winter; in a word, strict factory inspection.

CO-OPERATIVE AND PROFIT SHARING.



CO-OPERATIVE ESTABLISHMENTS.

The great number of these enterprises will be of absorbing interest to the citizens of the state. That all of those mentioned in the following chapter are successful is of still greater interest. Below is found the names and locations of such institutions:

Minburn Co-operative Association, Minburn, Iowa.
Panther Co-operative Association, Panther, Iowa.
Farmers' Co-operative Association, Grinnell, Iowa.
Ames Co-operative Association, Ames, Iowa.
Letts Co-operative Association, Letts, Iowa.
Farmers' Co-operative Association, Cooper, Iowa.
Linden Co-operative Association, Linden, Iowa.
Farmers' Co-operative Association, Anthon, Iowa.
Farmers' Supply Company, Grand Junction, Iowa.
Farmers' Supply Company, Newell, Iowa.
Farmers' Supply Company, Marathon, Iowa.
French Garden Co-operative Association, Cedar Rapids, Iowa.
Alliance Mercantile Association, Cresco, Iowa.
Amana Society, Amana, Iowa (see, separate article, Part II.)
Icarian Colony, Corning, Iowa (disestablished).
Farmers' Co-operative Society, Rockwell Iowa.

The financial and other statements (names omitted) of several concerns are appended, showing the growth of these institutions from year to year.

FIRST EXHIBIT.

MR. C. F. WENNERSTRUM:

Dear Sir,—Your communication received and noted. We organized in 1891 with a paid up capital of about \$1,800, which has been added to from time to time until there has been received by our association, in all, in cash, \$6,306.54; the rest of our capital stock, \$9,050, is gain, for which stock has been issued.

In the ten years we have paid out over \$7,000 in dividends, and have a surplus larger than our capital stock, beside the net profits of the past year, \$2,693.40. We have sold a little over \$60,000 worth of goods the past year. The secret of our success, I think, lies in the fact that we have a large number of

stockholders, over 250, and that no one can get a controlling interest, \$100 of stock being the most which one person may own.

This is followed by five annual statements in consecutive order.

STATEMENT SHOWING THE CONDITION OF THE MERCANTILE
ASSOCIATION, JANUARY 6, 1896.

RESOURCES.

Cash in First National Bank.....	\$ 1,041.99
Cash on hand (not in bank).....	5.55
Bills receivable.....	625.67
Amount of invoice.....	7,570.80
Store building and fixtures.....	4,640.84
Unexpired insurance.....	37.50
Due (name omitted).....	5.63

\$13,927.98

LIABILITIES.

Amount of capital stock.....	\$ 9,110.00
Sinking fund.....	1,862.66
Salaries (unpaid).....	52.00
Undivided profits.....	2,903.32

\$13,927.98

STATEMENT SHOWING THE CONDITION OF THE MERCANTILE
ASSOCIATION, JANUARY 6, 1897.

RESOURCES.

First National Bank.....	\$ 874.16
Cash on hand.....	52.53
Bills receivable.....	619.86
Unexpired insurance.....	37.50
Amount of invoice.....	9,090.42
Store building and fixtures.....	5,237.45
Dne (name omitted).....	1.25
Due (name omitted).....	1.20

\$15,914.37

LIABILITIES.

Amount of capital stock.....	\$ 9,060.00
Amount of sinking fund.....	4,219.38
Salaries (unpaid).....	45.46
Due (name omitted).....	446.87
Due (name omitted).....	113.40
Due (name omitted).....	5.00
Undivided profits.....	2,024.26

\$15,914.37

STATEMENT SHOWING THE CONDITION OF THE MERCANTILE
ASSOCIATION, JANUARY 4, 1898.

RESOURCES.

First National Bank.....	\$ 1,450.92
Cash on hand	56.09
Bills receivable.....	562.74
Unexpired insurance.....	38.22
Store building and fixtures	5,237.45
Amount of invoice.....	9,413.19
Due (name omitted).....	6.25
Due (name omitted).....	10.00

\$16,774.86

LIABILITIES

Amount of capital stock.....	\$ 9,060.00
Surplus.....	5,337.64
Salaries (unpaid)	30.45
Due (name omitted)	61.34
Undivided profits.....	2,285.43

\$16,774.86

STATEMENT SHOWING THE CONDITION OF THE MERCANTILE
ASSOCIATION JANUARY 4, 1899.

RESOURCES.

First National Bank.....	\$ 1,076.89
Cash on hand	17.46
Bills receivable.....	586.75
Unexpired insurance.....	34.50
Store building and fixtures	5,237.45
Amount of invoice	11,317.05
Due (name omitted).....	2.70
Due (name omitted).....	3.50

\$18,276.30

LIABILITIES.

Capital stock.....	\$9,060.00
Surplus.....	6,264.07
Salaries (unpaid)	35.00
Undivided profits.....	2,917.23

\$18,276.30

STATEMENT SHOWING THE CONDITION OF THE MERCANTILE
ASSOCIATION JANUARY 3, 1901.

RESOURCES.

First National Bank.....	\$ 1,663.85
Cash on hand	120.68

Bills receivable.....	1,078.65
Amount of invoice.....	11,806.63
Store building and fixtures.....	5,237.45
Church property.....	1,510.00
Unexpired insurance.....	23.28
Claim (name omitted).....	4.50

\$21,445.04

LIABILITIES.

Capital stock.....	\$ 9,050.00
Surplus.....	9,675.44
Salaries (unpaid).....	26.19
Undivided profits.....	2,693.41

\$21,445.04

SECOND EXHIBIT.

FARMERS SUPPLY COMPANY.

STATEMENT OF SIX YEARS' BUSINESS.

Years.	Paid Capital.	Profit.	Sales	Members.
1893	\$ 915 00	\$ 657.37	\$ 8,000.00	30
1894	1,523 00	1,052.69	15,000.00	75
1895	2,175 00	1,179.22	15,000.00	147
1896	2,772 00	972.77	12,306.00	192
1897	3,038 00	1,257.13	14,001.00	210
1898	3,373 00	2,017.79	18,724.00	263
Totals		\$7,146.97	\$83,031.00	

Average net profit per year, for six years, on our sales, 8.66 per cent.

Average net profits per year, for six years, on average paid-up capital, 60 per cent.

Average cost of handling goods, 8 per cent.

All goods bought and sold for cash.

Every member of the association a storekeeper.

The largest in point of number of members of any like association in Iowa.

STATEMENT, 1899.

ASSETS.

Real estate.....	\$2,900.00
Furniture.....	217.55
Cash.....	516.74
Merchandise.....	2,179.69
Coal.....	374.75
Rebates paid.....	194.98

Total \$6,383.71

LIABILITIES.

Stock paid up.....	\$3,884.68
Taxes, 1899.....	100.00
Net profit, 1899.....	2,435.03
Total.....	<u>\$6,383.71</u>

Total cash sales 1899, \$22,268.65. Sales to members \$16,000.00. Sales to others \$6,268.65. Net per cent. of profit on capital, 60. Gross profit on sales, 16 per cent. Net profit on each dollar sold, 10½ per cent. Cost to handle goods, 6 per cent.* Members, 300.

DIVIDEND.

A dividend of 6 per cent. on paid up capital and a rebate of 10 per cent. on each dollar's worth of goods purchased by the members during the year 1899 is hereby declared payable on and after January 15th, 1900, one-half cash and one-half stock.

THIRD EXHIBIT.

ASSETS OF CO-OPERATIVE ASSOCIATION, JANUARY 5, 1900.

Real estate.....	\$ 2,900.00
Merchandise.....	5,303.38
Cash on hand.....	<u>1,319.58</u>
	<u>\$9,572.96</u>

LIABILITIES.

Capital stock.....	\$ 6,600.00
Undivided profits.....	1,807.04
Taxes.....	100.08
Due directors.....	60.00
Sundries.....	162.45
Net gain.....	<u>843.39</u>
	<u>\$9,572.96</u>

On January 20, 1900, we declared a dividend of 12 per cent, and on the 20th inst., we declared a dividend of 15 per cent.

November 26, 1900.

P. S.—The following additional facts may be of interest to you:

The Co-operative Association of ——— Iowa, was incorporated in 1890; reincorporated in 1891.

Number of charter members, seventy.

Number of members November 1, 1900, sixty-nine.

Our corporation has been a success from the start, and has paid good dividends all the time. We started with a capital of \$1,835.

I give the following extracts from my statement of January, 1900:

Total sales during 1899.....\$16,888.52

* Exact copy of their statement

Total sales during 1898.....	15,677.61
Increase of sales over 1898.....	1,210.91
Average daily sales.....	53.95
Expenses for the year 1899.....	1,308.35
Average daily expenses.....	4.18
Proportion of expenses to sales.....	7.74%
Net gain during 1899.....	843.39
Proportion of net gains to sales.....	4.99%
Proportion of net gain to capital stock.....	12.77%
Proportion of net gain to capital stock and undivided profits.....	10%
Gross profit on sales.....	12.74%
Number of times sales exceeded capital invested exclusive of real estate.....	8.07
Number of times sales exceeded total capital invested.....	0.02
Total capital invested in the year 1899: Capital stock, \$6,600, undivided profits, \$1,807.04.....	8,407.04
Our sales for 1900 will exceed \$20,000. One month (September) our sales averaged \$72.00 per day.	

FOURTH EXHIBIT.

CO-OPERATIVE BUTTON WORKS.

Twelve men associated for mutual benefit commenced work October, 1899. Cleared \$270 in nine months after paying to the members regular wages.

It is to be regretted that this establishment, which was evidently prosperous, declined to give the representative of the Bureau any satisfactory data even after being assured that no names would be given. Part of their communication is here quoted. "We are believers in co-operation, as it will solve the labor problem. No strikes, lockouts, blacklists, etc.

FIFTH EXHIBIT.

IT FOOTS UP TO \$700,000—REMARKABLE YEAR OF CO-OPERATIVE ASSOCIATION.

The Co-operative Society of ———, has held its twelfth annual meeting, and the last year's record has been without parallel in its history—with a total business of the year of nearly \$700,000, or \$600,000 more than its first year a little more than a decade ago, and an increase of \$100,000 over last year, which was supposed to be its high tide. Last year when the secretary announced the fact that after ten years of history the society had gone from \$275,000 of business, the

previous year's total. to \$454,000, it was predicted that the society would rarely, if ever, surpass this record. The figures as reported by the secretary for this year are, in round numbers, \$625,000, but according to the statement of President —, that should be increased nearly \$75,000, from the fact that much grain at — was exchanged for merchandise, and the latter article was not figured into the business, on the double entry plan which in the association counts both the buying and selling of grain and merchandise in the sum totals for the year. So that the business on this double entry plan would this year approach nearly \$700,000. An equally flattering showing was revealed in the report of the liabilities and resources of the association. Last year the net balance in favor of the society was \$7,000, which was heralded with great applause. This year, through the careful oversight of the excellent board and the superb management of —, the manager, the surplus went up to \$11,000, a fact that was very gratifying to the management, and one that was received with enthusiasm by the stockholders.

The following is the record for the past six years:

1895.	\$219,000
1896.	251,000
1897.	224,000
1898.	275,000
1899.	545,000
1900.	700,000

Very eloquent are these exhibits, and it is a cause for regret that more of these concerns did not avail themselves of the privilege of showing the side of co-operation that appeals to the material interest of man.

This Bureau is aware that there are a number of co-operative creameries in operation, but did not get sufficient data to justify their publication.

The Amana Society will be mentioned in a separate article, written by Mrs. Bertha H. Shambaugh, of Iowa City, and the Icarian Colony, though dissolved, will have separate special mention.

Care has been taken that information given should be from first hands and authentic.

PROFIT SHARING.

The plan of sharing the profits of industrial establishments with their employes as a method of preventing many of the disputes which have prevailed throughout the country between employers and employes having attracted the attention of our citizens in Iowa who have inquired concerning this system of co-operation with the results, we have endeavored to obtain all the information possible by sending the following letter of inquiry to twelve establishments who we were advised had introduced the "profit sharing system," none of which, however, exist in Iowa.

The four appended replies were the only ones of sufficient importance justifying publication. The names of three are withheld for obvious reasons, and one is so well known that its identity in this connection could not be hidden even if it were desired.

DES MOINES, IOWA, November 24, 1900.

Messrs.— — — — —:

GENTLEMEN: In the forthcoming report of this bureau we desire to make an exhibit of "Profit Sharing" as viewed by those who have placed the system into operation.

It is reported that your establishment has been very successful in this direction and that your employes are highly satisfied.

If you would kindly give us an outline of your method, length of time in operation, and an account of the results achieved so far, the favor would be highly appreciated by the people of Iowa.

Very respectfully,

C. F. WENNERSTRUM,
Commissioner.

....., Mo., Nov. 30, 1900.

C. F. WENNERSTRUM, ESQ.,
Des Moines, Iowa.

DEAR SIR—Answering yours 24th inst., asking for outline of our profit sharing method and the results so far seen, I have pleasure in saying: We adopted the profit sharing system in the spring of 1886. The term "profit sharing" as technically used means a division of the general net

profits of a business between the capital and the wages of employes. The term has been more exactly defined by the International Congress of Co-operators and Profit Sharers to require that the division shall be by a fixed system for a certain period declared in advance. That is to say, it must not be dependent upon the decision of the employer at the end of the term, as it would then come in the nature of a gift, and would, moreover, be dependent upon the caprice of the employer. On the 1st of March, 1886, having decided to adopt the system, we put in the pay envelopes of all employes, then numbering about 225, the announcement that at the end of the year we should, after allowing the commercial rate of interest on the capital actually employed, apportion the remainder of the net profits as follows:

Ten per cent. for Surplus fund.

Ten per cent. for Provident fund.

Three per cent. for Educational or Literary fund, and the remainder by equal per centage on the capital employed and the wages of all employes who had worked as much as six months at any time during the year. Under this arrangement, there was a dividend of 6 per cent. the first year, 10 per cent. the second, and varying from 10 to 5 per cent. until 1894, since which time no dividends have been paid, as the earnings did not go beyond the interest on capital. The first three years, the dividends were paid in cash, with the privilege of investing them in stock of the company, of which about half of the receivers took advantage. Cash dividends having been paid long enough to make it clear to wage earners that there was something in it, it was made payable in stock, subject to redemption by the company at par. The Provident fund was placed in charge of a committee selected by the men in each of the five departments. The purpose of the fund was to provide for the sick and disabled and the orphans and widows. The Literary fund was intended for a library and perhaps sending some of the children through higher education. In 1892 the basis of the division was changed so as to allow 2 per cent. on wages to each one on capital in excess of the interest rate. The men were requested to elect an auditor to examine the books and report at the distribution meetings. No employe has ever criticised the management or shown any disposition to interfere with it. The number of employes has in the meantime about doubled and while no dividends have been paid for five years, there have been no complaints. The depression in the building trades during these years, easily accounted to them for the absence of surplus earnings. With better times, the dividends will soon be resumed and it is hoped will be such as to equalize with the lost period.

In furtherance of the same principle that induced the company to adopt the profit sharing, it procured a tract of 125 acres of land, 18 miles from the city, in the high lands of Illinois. It there built factories and laid out a residence village in park fashion, made roads and sidewalks, planted trees, built a club-house, a bowling alley, billiard room and houses to be sold to the employes. The village was named Leclair, in honor of the French house painter who inaugurated the profit sharing system in 1842 and founded a house which is still in active business under the control of the one thousand employes. In this village, which adjoins the large county seat of Edwardsville, there are now 175 men and boys employed in the factories,

about 160 residents in the village itself and it has a kindergarten and primary school, a lecture course every winter, a circulating library, good baseball campus, well kept streets, no saloons, no policemen, no boss and a very fine lot of people. The president and the secretary of the profit sharing corporation whose chief business is still in St. Louis are residents of Leclaire. There are fifty members of the bowling clubs, filling every night of the week. The extension of the works accounts in part for the cessation of dividends but it has also come to seem more important to spend money freely on the common purposes than to make individual distributions, not that the system of dividends will be abandoned but the expenditures for the common welfare are really more to the point. The profit sharing spirit has shown more expansion in this country in the direction of betterment of the social condition of workers than in that of actual dividends. At the present time a very large number of employers throughout the country are doing something beyond a mere payment of wages and this is done in exactly the same spirit that brings profit sharing into use. An employer can do nothing better either for his business prosperity or for his own satisfaction than to improve the conditions under which his associate workers do their work and live their lives. Village Leclaire enjoys the unique distinction of being an almost exclusively workingman's settlement and at the same time being a show place for its large and aristocratic neighbor. Our roads are good for driving, wheeling or walking, being kept perfectly smooth and well sprinkled, the abutting yards are all well kept, the lawns being carefully mowed, and having plenty of flowers and shrubs and a good many fruit trees. The houses are for the most part built upon lots one-third of an acre in size, they all have choice running water and electric light. Our most interesting element is the children. Besides the kindergarten, we have a dancing class of 32, several reading clubs and a gardening club of about 40. I never saw quite so bright and handsome a kindergarten class as appeared in the Thanksgiving program a few nights ago.

Very sincerely,

N. O. NELSON.

NELSON'S LECLAIRE.

A GOOD MAN AND THE INDUSTRIAL SETTLEMENT HE FOUND-
ED—WHERE MEN WHO WORK ARE HELD IN THE HIGHEST
ESTEEM, RECEIVE THE VALUE OF THEIR LABOR AND LIVE
LIKE HUMAN BEINGS.

Probably the first and best known attempt in this country to establish a closer relation between labor and capital through generous concessions on the part of the latter is that which is symbolized in the village of Leclaire, Ills. It was so named for the French socialist, whose bust in bronze adorns the village schoolhouse. The founder of this settlement is a Norseman, Nelson O. Nelson, and here he has set up some acres of shops for the manufacture of plumbers' supplies and mantels. The company which bears his name has its offices in St. Louis, in a large, commonplace building, and Leclaire is eighteen or twenty miles away.

Mr. Nelson, who is still in the prime of life, yet bears the distinction of being "the father of profit sharing in America." Probably more than any other man he is responsible for the many devices that progressive and liberal employers have adopted to gain the better will of their working forces.

Leclaire is not a commune, though it is an industrial settlement. It is in a green, pleasant, rolling country, where they say the nights are always cool, where they have no mosquitoes, no malaria, no— For the rest read the card of any real estate dealer, whether in Cape Nome or Havana. You leave the cars at a station called Edwardsville. The town of that name lies on the left of the track and has 5,000 people and twenty-two saloons, while Leclaire, on the right of the track, hasn't a saloon. Edwardsville is accounted a right smart little place, with so much culture that neighbors drive in to see it, yet Leclaire easily outdoes it. There is more wealth in one block of Edwardsville than in nearly all Leclaire, yet in the latter village you see not a single rickety shed, not an unpainted house, not a weed-filled yard, not a rutted road, not a board fence plastered with aged circus posters and medicine signs. It is all unpretentious, but charmingly neat. Excepting a couple of miners, who dig coal in a hole across the way, the people of Leclaire are all in the employ of the Nelson company. It is not to be imagined from this that coercion is used to make the brass molders, carpenters, machinists, marble sawers and the others live there. Quite the contrary.

There is not room for half of them, and the others have to live in more ordinary quarters, that they find in Edwardsville. Rents are low. From \$6 to \$9 a month is asked for a neat cottage that is kept in excellent repair and supplied with running water and electric light free of charge. The lawn, before it is trimmed every week by the company, and the streets are sprinkled every day. Furthermore, through the good offices of Mr. Nelson, the dwellers in LeClaire enjoy especially easy terms in the matter of railroad fares. The round trip to St. Louis costs a stranger \$1.50, but any worker in the Nelson shops may go to the city and back for 50 cents. Were it not that the founder of the colony is everywhere esteemed, a concession like this would never have been secured. But one hears nothing but praise for him, no matter how heartily the man who admires him may disagree with his economic theories. The brakemen on the trains ex-

claim, "There's a man for you!" and washerwomen say, "Sure, he's the poor people's friend."

There is no self seeking on the founder's part in this experiment in altruism. He believes thoroughly in his people; believes thoroughly in men. He wants to do good and takes the same satisfaction in it that so many folks take in doing bad. When objection was made to a family that had just come into the village, he said, "If these people are good, we want them, and if they are bad, we'll make them better."

Though his own house is the largest in the place, it is hardly distinguished from the others. It is plain, but comfortable. It has flowers and shade, and of every other dwelling in Leclaire one may say the same. In rose time the air is heavy with the scent of thousands of blossoms. In laying out Leclaire a departure was made from the conventional in that the roads curve like those in parks instead of bolting into the distance by the straight way. The effect of a walk, as fresh vistas open before the stranger, is charming. Partly surrounding the village is a farm, which has been operated as a department of the Nelson company's industries, like the brass foundry and the planing mill, the farmers receiving wages and sharing profits also and the produce being sold in part at especially low prices to the villagers. These acres are in splendid yield, but this season the experiment has been made of renting them to outsiders, the company profiting by the certainty of rental. It is said that the company will resume the management of the farm next season, but its discontinuance, even for a single year, suggests inquiry whether this phase of Leclaire's industries is so thoroughly indorsed by those who profit by it as the founder hopes it is.

There has never been a strike in the Nelson shops. But here is a remarkable thing. Nearly all the workers are members of labor unions and have joined them by advise of their employer.

The wages are the same as are paid in the city for the same class of work, the union scale being adhered to, although the expense of living in Leclaire is considerably less than in town. The hours are ten a day, except on Saturday when work stops at four.

In appearance and character there is no marked difference between the employes of the Nelson company and any other. The usual mixture of American and Europeans is found. This matter of profit sharing affects different people and different classes of workingmen in different ways. It has certainly worked

good here; it has revolutionized Ivorydale for the better; it has brought content into dozens of places.

The attitude of the workers in Leclaire is not that of loyalty, but of equanimity. The holding of their places has no more to do with their political doctrines than has their religious creed. Profit sharing, when it is justified by earnings, occurs in the form of an added percentage on wages. If the dividend is 2 per cent, a \$1,000 man receives \$20 and a \$200 office boy has \$4. Certain expenses are first deducted from the gross earnings, allowance is made for wear and tear of machinery, insurance and the like, and the net profit is divided. Piece workers have their shares no less than the men on wage, and in their case the yearly sum of the earnings is the basis of the percentage of extra profit. Everybody, from high to low, is included unless it might be the man who came in yesterday, and it would hardly be right to the others to give the same share to him as to the men who had been in the shop for a year, yet full dividends have been paid to men who have worked for only two months. Some of the men own stock, and possibly if all could be persuaded to do the same the alacrity and interest would increase.

The spirits of the men are pleasantly exhilarated after these divisions of money. They whistle at their tasks and wear cheerfulness in their faces. Doubtless they work a little better for awhile. And it is a part of Mr. Nelson's plan to keep them content in their homes, as it is to add to the pleasure of humanity at large. He has several times taken trainloads of children from the St. Louis slums and filled their lungs with the air and their eyes with the green of the Illinois fields, and it is said that he is arranging to have some of the children of the city poor cared for in country homes in hot weather. And he has likewise taken the children of his working people to St. Louis that they might see its wonderful smoke and its pet bridge and the steamboats in its river that looks like chocolate, but isn't, and its queer substitutes for street cars and soldiers in strike times.

Then there is an annual picnic, with cake, ice cream, cigars, music, dancing, and a good time for all the people in the shops and offices, and the joy of the occasion is not diminished by reason of the eloquence which is imported.

No charge is made for any lectures or entertainments that are given in Leclaire. Mr. Nelson will not allow it. Either the speakers are so well pleased with the sound of their own voices that they get their pay from the privilege of speaking or they

confer with Mr. Nelson privately after the performance. A debating club is maintained by the members, and the virtues and vices of hard and soft money, sumptuary laws, handmade goods and territorial expansion are duly considered by this body.

Some of the men have accounts in the Edwardsville banks, however, and the Nelson company acts as banker for its people when so requested. A commoner form of thrift than the saving of money is the buying of a house, and in this the workman is always encouraged. Nearly all of the building has been done by the company, and one of its neat cottages, with water and light gratis, can be bought by an employe on almost any terms he wants to make, the deed being transferred to him when he has paid about \$600. He has a plank or concrete walk and maple trees before his door, and so long as he lives there his road will be watered daily, Sunday included, and his lawn and borders trimmed without charge. Occasionally, as the village grows, there is an auction of house lots, and they are sold absolutely without reserve. If the bidders happen to feel poor and the rivalry is not sharp, the land is sold very cheap.

Among the oddities of Leclaire are its free farms. Any worker for the Nelson company may help himself to all the land he wishes and work it for his own profit. The object of this is less to afford a means of wealth than to give wholesome out of door occupation of men who are much indoors, some of them breathing fumes in the brass foundry, and to enable them to have a variety of fresh and healthful vegetables and fruit on their tables. The worker keeps his garden as long as he wants it and the company plows and harrows the ground for him without charge. He is to take no more than he will readily use, however, and such of it as he allows to run to weeds is forfeited to any neighbor of more thrift or enthusiasm.—Charles M. Skinner in Brooklyn Eagle.

OHIO, November 26, 1900.

MR. C. F. WENNERTRUM,

Commissioner Bureau of Labor Statistics, Des Moines, Iowa.

DEAR SIR—A profit-sharing plan of our own has been in effect at our factory for some years, and we feel that it has been successful. You will find a very clear account of it and its results in the enclosed. If we can add anything to the article, please let us hear from you.

OUR EXPERIMENT IN PROFIT SHARING.

Any change in the methods of conducting the productive and

distributive business in the world to be successful and generally adopted, must first and last have in it that which will tend to lessen the cost of such production or distribution. However desirable profit sharing may appear to us from other points of view, this is the essential principle upon which its success or failure depends. Unless the employer increases the efficiency of his labor under the profit sharing plan to at least the extent of the profits so paid to his labor, he should not, as a business proposition, adopt it. If, however, the reverse is true and he increases the efficiency of his labor to an extent greater than the amount so paid to it, it is as incumbent upon him to adopt the profit sharing plan as it is to put in an improved piece of machinery, remembering also, that it is the first who in adopting improved methods secures the greatest reward. If profit sharing can show that where it is honestly and considerably administered, it is the means of developing in the employe that feeling of self-interest in his labor which will tend to secure the same thoughtful and honest efforts as though he were working for himself, then it has demonstrated its right of being, as the main claim of the employer is that the root of existing troubles lies in the fact that the employe takes no interest in his work and has no consideration for his employer's property or welfare.

Now, how can profit sharing prove its ability to produce this change in the employe's feelings? If it can be shown in a manufacturing establishment continuing under the same management, even down to practically the same foreman of departments, that since profit sharing has been introduced, strikes and labor troubles are unknown, where before they were common; that the waste of material has been reduced one-half; that the number of employes leaving the employ, or being discharged for cause during the year has been reduced to one-third the number so doing prior to the adoption of the system, and that the actual labor cost of manufacture, including in such cost, the amount of money paid to employes as the profit sharing dividend, has been lowered, then we think profit sharing will be justified in claiming that it has supplied that motive to self-interest in the employe's work, which is now admitted to be so sadly lacking.

It was during the year 1886 that the Knights of Labor began to assume such prominence, and employes in manufacturing establishments throughout the country became more or less restless. During that year a firm of soap manufacturers in Cincinnati, had in their various departments no less than fourteen different

strikes, having at different times from eleven to one hundred and fourteen of their employes quit work in a body, and for all sorts of trivial causes. They were continually at the expense of breaking in new people, and the question was one of constant anxiety. After considerable hesitation, it was decided to put into force a plan of profit sharing and to secure, if possible, some relief from these troubles. It was decided to allow as a portion of the expense of manufacturing, a reasonable salary to each active member of the firm, and to divide the remainder of the net profits between the firm and the employes in the proportion that the labor cost of production bore to the total cost of production. In other words, if the sales were \$100,000 and the net profits, after deducting the salaries of the firm, \$10,000, then the total cost of production would be \$90,000. Assuming that the amount paid for wages was \$20,000, then the \$10,000 of profit would be divided, seven-ninths to the firm and two-ninths to the employes.

The proposition when made to the employes was accepted in a half hearted way and without any belief upon their part that it would be of material benefit to them. At the end of the first six months a dividend of 11 per cent upon the wages was declared. During the next six months there was evidence that some of the employes were beginning to take a little interest in the working of the plan, and in order to encourage them and to reprimand those who did not take an interest, the plan was adopted of dividing the employes into four classes, the first class getting double the regular dividend and including those who showed unmistakable signs of appreciation of the fact that it was incumbent upon them to help make the profits. The second class received the regular dividend and included the bulk of the employes. The third class were those who did not evince much interest in the plan and whose dividend was one-half the regular amount. The fourth class were those who for cause were cut out of any dividend at all. They continued working under this plan for two years, by which time they had managed to weed out the majority of those who took no interest in their work, and since then have had only two classes, those who share and those who do not. The total amount of profit sharing dividend is not affect by the number of those sharing. If for any reason they are compelled to decline allowing an employe to participate, his share is divided among the others.

This, briefly is the plan under which the company and their

employees are to day working. In the year 1887, the first year in which the plan was in operation, they had three strikes during the first six months. Since that time they have had absolutely no labor trouble. We believe it would be impossible to foment any such trouble among their employees now. As an illustration of how they feel, we might mention that it has occurred frequently that where some trouble arises the men themselves will come to the foremen and tell them all the details of it and suggest that the same be remedied. The old feelings of discontent and distrust have been replaced by that of mutual interest.

The class of labor employed in the soap factory is of the most ordinary unskilled kind. Over 85 per cent of our employees earn \$1.50 a day or less. This class of labor is the kind that most frequently shifts from place to place and is the class which of necessity you must frequently change. We are at the moment without exact figures relative to the proportion of employees who would continue for a year in the factories prior to 1887, but we think it a conservative estimate to say that one-half of the employees were replaced each year by new men. Last year, out of over 600 employees, we had six who left or were discharged for cause. Three of these were girls who were married, and two of them were men whom we discharged for just cause. The sixth employe left for some reason which we do not know. Too much stress cannot be placed upon the advantage of being able to retain the employees year after year. Even though the labor is unskilled, it takes some time to break in a new man so that he is as efficient as one who is familiar with the work to be done.

It is very difficult to determine exactly what proportion of the labor saving that has been effected in our factories, since the profit sharing plan has been in force, is due directly to the profit sharing plan, and what is due to improved machinery and methods of manufacture. Our labor cost of manufacture, including a 12 per cent profit sharing dividend upon the wages for the year 1894, was 63 per cent of what it was during the year 1886, and this in spite of the fact that the average rate of wages in 1894 was a trifle over 12 per cent higher than in 1886. Figuring conservatively and throwing all questionable items against profit sharing, they estimate that the improved methods of manufacture are responsible for 28 per cent of the 37 per cent shown, leaving as a net result to the credit of profit sharing, a saving equal to 9 per cent plus the 12 per cent increased wages or 21 per cent cheaper labor cost of manufacture under the profit sharing system.

As to the saving in material, this also is a difficult question to determine. Unfortunately, it is not possible to keep accurate accounts of saving under this head. We can instance, however, one thing which shows how the profit sharing plan works. One of the principal sources of waste in the factories is due to the waste of scraps and small pieces of soap by allowing them to fall upon the floor and become trampled under foot. The dirty soap used to accumulate so rapidly that it was necessary to work over the accumulation every two or three weeks. Now it takes three or four months to accumulate a sufficient quantity to be rehandled. The effect of saving by the employes can also be seen in the general air of tidiness and cleanliness about the factories.

There is no question that in this factory, profit sharing has done more than answer the questions propounded above, and the tendency has been, wherever possible, to extend this same profit sharing principle, and to encourage more and more the spirit that it has started among the employes. This has been done by having employes become interested in the stock of the company, trying to induce them to put their savings into the business for which they are working, so that all their interests shall be in one place. As an instance of the willingness of the employes to bind themselves more closely to their work, we would mention that after the last semi-annual profit sharing dividend, the employes subscribed for \$5,250 worth of the common stock of the company.

While the profit sharing plan is today working so smoothly and profitably to the interests of the *capital* invested in the business, yet it must not be assumed that it came to this state without any drawbacks or disheartening circumstances. The employes of the company were of the ordinary type of day laborers, ignorant and suspicious; and it was only by absolute fairness and justice in ruling upon all claims and allowances to be made for them, that the management had succeeded in fully gaining their confidence. We do not think that any person who will adopt the profit sharing plan need expect that it will pay its own way for the first two years; but after that, if the employer will do his share of it and treat the employes with consideration and with an effort to show appreciation for any attempts they may make, even though misguided, to improve the work of their department, we feel assured that the ultimate outcome can only be to the more firm establishment of the system. It is by no means an uncommon occurrence now for the employes of this company to show decided interest in the character of the goods being shipped, taking

especial pride and pains in those in which they assume that the larger profit is made. They will call the attention of the foreman to little questions as to quality of the different brands of soap manufactured, showing plainly a desire upon their part that they shall do their share in seeing that nothing goes out from the factories which would tend to injure the demand for the products of their labor.

These results have been obtained during a period of time when the feeling between employer and employe generally has been strong and bitter. The spirit of bitterness had already developed in the factories described, showing that there was nothing peculiar to their management that would exempt them from the same troubles so many others have had. The results have been obtained not at any cost of profits to the capital invested, but at an actual increase of profits to the capital. All that was done was to allow the employe an opportunity to save money for himself. He did it and more.

We have never been forced to meet the question. What would be done in the event that no profits were earned or that a loss was incurred? We have told our employes that we would not expect them to share in any losses. We feel that even in the event of a year's business showing a loss, it would be an injustice to ask them to bear any proportion of it beyond the loss they already sustained during the year by giving the increased efforts and care for which they received no recompense.

.....MINN, November 28, 1900.

MR. C. F. WENNERSTRUM,

Labor Commissioner, State of Iowa.

DEAR SIR:—Your favor of the 24th, addressed to us, at hand.

There was never any system of co-operation in existence in this concern, but we have had and do now have a system of "profit sharing."

This was inaugurated in 1882.

The plan at that time was for the firm to first receive from the profits each year a certain per cent on capital invested, and if there were any profits above the sum required to pay this, then a certain per cent of that sum was set aside as a dividend for the employes, and the balance went to the firm.

Each employe who had been with the firm two years received a pro rata share of the sum so set aside, based on the annual salary or wages.

The firm was not able to pay a dividend every year, but some of them were very large, running as high as 65 per cent of the annual salary or wages.

In 1889, the firm sold out to the present corporation, and the system con-

tinued, but on a somewhat different basis, and not quite so favorable to the employees. In addition to this, the profits on the goods we manufacture are very much smaller now than in the '80's.

The men have always been satisfied with the arrangement, and if they received a dividend they looked upon it as something not to be counted on beforehand, and when one is passed there has never been any manifestation on their part, as our employees are unusually intelligent, and readily recognize the situation.

We are pleased to report the effect has been to secure for the company first-class employees, who retain their positions for many years, and, by reason of the experience so obtained, very many new methods and economies are suggested and put in operation voluntarily to the benefit of all concerned.

In your reference to this experience of ours we would not care to have it made so pointed that we could be located.

Very truly yours,

.....Ohio, Feb. —, 1901.

MR. C. F. WENNERSTRUM,
Des Moines, Iowa.

MY DEAR SIR—I herewith send you a brief description of the conditions prevailing in our works which will enable you to fairly understand our system.

We employed last year from eighty to one hundred men. We have not gone into a systematic "profit sharing," but for the past five years have paid a uniform and arbitrary 5 per cent. in addition to the usual wages to all of the employees; this might be called a dividend, or it might be called a present; it really amounts to a raise of wages, and is all paid in a lump at one time.

Our minimum rate for common labor is two dollars for an eight-hour day. We have the eight-hour day throughout all our departments, forty-eight hours per week, no overtime, no piece work, no system of petty contracts so that one man is given an opportunity to make profit from the toil of his fellow workman. No premium system or piece price plan that gives the strong an advantage over the weak, our employees have proven that he who does his best does all he can, and because he does deserves the right to live and work. We have no "time keeper," no time clock to ring in and ring out, every man works on honor, keeps and reports his own time.

Our competitors all work on the twelve-hour per day system, we are so successful on the eight-hour per day system that it will never be necessary to go back to the twelve-hour day.

In 1899 we inaugurated the system of vacations for all employees. For years it has been customary in large concerns to allow office employees an annual vacation of at least one week without deducting their wages for the time lost.

The question was forcibly brought to our attention that if men who work in pleasant offices and who usually work shorter hours than those who work in the shops are entitled to a vacation with pay, why are not those who

work in a dingy noisy shop at more irksome and less congenial toil be entitled to the same privilege?

The query was an honest one and deserved an honest answer, we either had to restrict the privilege or extend it, we applied the latter remedy and have found the arrangement has worked very satisfactorily.

It was feared that difficulties would occur in making plans so that all could take their vacations at or about the time desired, but by harmonious action between the foreman and the shop force the vacations were all satisfactorily arranged and at no time was the successful carrying forward of the business interfered with by too many taking their vacations at one time, the benefits have been mutual and the system will be continued, we find a week's relaxation from work without anxiety concerning loss of income stimulates interest, endeavor and happiness.

Our factory has but one rule, "Whatsoever ye would that men should do to you do ye even so them," we find it eminently practical, we have directors for the arrangement of the work but no bosses.

We employ no child-labor, although many of our men really do children's work. We lay no claim to generosity, nor charity, it is simply justice, we do not claim that we have reached a just system of distribution yet and the little we are doing is simply an earnest belief of the dawning of a better day in industrial conditions.

We believe as society grows, it is to be succeeded by a more just system of relation, and as we learn by experience and get wisdom to take other steps, we hope to be ready to go forward.

We are glad to know that the spirit of investigation and inquiry is abroad, and that there is a good deal of effort in different sections of the country to arrive at a more just social and industrial relation between employers and employees.

Mr. _____ of _____ Mo., is an employer of a large number of men who has given the "Profit Sharing System" serious thought and practice for a good many years; you will do well to also correspond with him.

Sincerely yours,

LOCATIONS FOR NEW INDUSTRIES

LOCATIONS FOR NEW INDUSTRIES.

Chapter 8, section 2470 of the Code says: "The commissioner shall collect information of and report on sites offering natural or acquired advantages for the profitable location and operation of different branches of industry; he shall by correspondence with interested parties in other parts of the United States, impart to them such information as may tend to induce the location of mechanical and producing plants within the state, together with such other information as shall tend to increase the productions, and consequent employment of producers."

Two thousand circular letters were sent to representative men in the state, embracing legislators, mayors of cities, and all the newspapers, from whom we received the most valuable information. The heartiness and promptness of these responses were especially noteworthy.

The following counties possess special advantages and many of the localities are willing to offer inducements for the location of new industries:

ADAIR COUNTY.

Adair—Want grist mill, canning factory, brick and tile works, cigar factory, beet sugar factory, and department store.

Bridgewater—Plentiful supply of coal, water, and clay.

ADAMS COUNTY.

Prescott—Coal and water in abundance.

ALLAMAKEE COUNTY.

Lansing—Pearl button finishing plant, or any other light industry.

Iron mining is being developed in this county, and the outlook is promising for greater results from this industry.

Postville—Fine railroad facilities; cigar and canning factories wanted.

Waukon—Beet sugar factory and cold storage plant wanted.

APPANOOSE COUNTY.

Centerville—Need more wholesale houses, beet sugar factory, pickle and canning factories, all of which could do well.

Mystic—Coal, water, timber, and stone of good quality, make this county suitable for almost any kind of diversified industry.

BENTON COUNTY.

Belle Plaine—Splendid railroad facilities, fuel plentiful and cheap, inducements to prospective manufacturers, good surrounding markets.

BLACKHAWK COUNTY.

Cedar Falls—Good water power, splendid shipping facilities, unoccupied plants on market at low figures, especially suitable for starch works, beet sugar factory, or paper mill; educational advantages and environments of superior character.

Hudson—General store, clothing store, dentist and lawyer wanted.

Laporte—Is in need of a cold storage plant.

Waterloo—Many new industries recently started which are doing well; can accommodate several more. Splendidly situated for manufacturing and jobbing.

BOONE COUNTY.

Boone—Enterprising community, best of railroad facilities, good markets, cheap fuel, all kinds of manufacturing invited, superior inducements offered but no bonuses.

BREMER COUNTY

Waverly—Good water power, many geological advantages which need developing. Brick, tile and cement industries would do well here, and encouragement given to those who would establish industries in good faith.

BUENA VISTA COUNTY.

Vegetable canning factories would do well in this county, and fruit growing could be profitably and successfully operated.

CALHOUN COUNTY.

Lohrville—Has first-class clay for brick and tile making, best of shipping advantages, vegetable canning factories could be operated at this place at a lower cost than in many other localities. Straw board and paper mills would find an ideal location here.

Thousands of tons of straw is wasted here every year. Sugar beet factories are especially desired by the farming community, who would give every material encouragement. The soil is particularly adapted to sugar beet raising.

CARROLL COUNTY.

Lake City—Would aid any legitimate enterprise. Need a canning factory, a foundry, and a creamery.

Carroll—Wants a canning factory, foundry and machine shop, and light manufacturing; best of shipping facilities.

CASS COUNTY.

Atlantic—Unlimited supply of water of good quality; will make site propositions, will give a rebate on taxation, and in other material ways aid new industries. Unexcelled railroad accommodations. Special industries to use corn products, pickling establishments, oat meal or other cereal mills, tomato and other vegetable canning factories would find this a profitable location.

CEDAR COUNTY.

Tipton—Substantial aid will be given to any new industry.

CERRO-GORDO COUNTY.

Swaledale—An idle creamery building could be utilized to considerable profit as there is great demand for local products. Wanted, a furniture store, dentist and a lawyer.

CHEROKEE COUNTY.

Cherokee—Is badly in need of a vegetable canning factory.

Aurelia—Has admirable location for flour and grist mill. Good clay for brick and tile factory.

CHICKASAW COUNTY.

Nashua—Splendid water power which would sustain several manufacturing concerns. A woolen mill could be purchased cheap and would be a profitable business for a practical man who could devote his time to the business.

New Hampton—Has excellent railroad facilities, and the community would help and encourage new industries.

Ioniu—Has a good opening for an exclusive clothing store.

CLAY COUNTY.

Dickens—Needs a canning factory and a cheese factory,

Spencer—Has best of water, good clay, and an abundance of sand and gravel. Transportation facilities good.

CLAYTON COUNTY.

Guttenberg—A splendid opportunity open to the basket making industry, or willow work of all varieties, labor is plenty and willows grow on the Mississippi river banks in profusion.

CLINTON COUNTY.

Clinton—Most favorably situated for box and furniture factories. Button works could do well here, especially a finishing plant. Excellent shipping facilities, and the citizens will materially help new industries.

Delmar—Is excellently located for transportation and abounds in material that would insure the success of brick and tile works, canning factories and beet sugar industries.

DALLAS COUNTY.

Minburn—Possesses a remarkable supply of the purest water. Any industry requiring large supplies of water could with advantage investigate this locality. Canning factories, cheese factories and kindred industries would find hearty support from the surrounding community.

Adel—Is in need of a vegetable canning factory.

Dallas Center—Is in need of brick and tile works, a steam laundry, an electric light plant, and an elevator. The people will give material encouragement to prospective industries

Dexter—Has an elegant location for a vegetable canning factory.

Perry—Has a good opening for a sugar beet plant.

DAVIS COUNTY.

Bloomfield—Has an abundance of good water, clay and timber that would meet every requirement for the profitable location of brick and tile works, canning factories, cheese factories, wagon and handle factories, and the people will give material inducements to new industries locating here.

DECATUR COUNTY.

Leon—Is in need of a flour and grist mill.

DICKINSON COUNTY.

Lake Park—Has ideal location for creameries and flouring mills.

A laundry badly needed. Splendid uncovered territory to draw on for sustenance of any such industries. Good shipping facilities, and material aid would be given by citizens. A cigar factory would be an appreciated institution.

DUBUQUE COUNTY.

Dubuque—Claims to be unexcelled; with natural advantages, and is prepared to extend every material help to new enterprises. The extensive lead and zinc mines in this county are being developed surprisingly.

Dyersville—Sites and building materials can be secured here cheaper than at any other point in state, rich territory, ample shipping accommodations and inducements extended to new industries.

EMMET COUNTY.

Estherville—This locality affords a good location for canning factories, woolen mills, and several wholesale establishments are wanted, especially in grocery lines; information and assistance cheerfully furnished by citizens to new industries.

Armstrong—A profitable location for brick and tile works.

FAYETTE COUNTY.

Maynard—A first-class men's furnishing store would do well here, and an opening for a good vegetable canning factory is waiting the first comer.

FLOYD COUNTY.

Charles City—Beet sugar culture would be a success in and around this territory, and a factory here would be welcome and supported. Any other light industry would find this a good location.

FREMONT COUNTY.

Hamburg—Natural advantages abound for industries dependent upon raw material from the farm. Water supply is so plentiful that it could be secured without cost; access to profitable markets is unexcelled, and every assistance would be extended to prospective or assured industries.

GRUNDY COUNTY.

Conrad—A good sand stone quarry here, could be profitably operated and brick and tile works are needed badly.

Beaman—Elegant deposit of clay here, suitable for paint manufacture. The town would offer special inducements to manufacturers of brick and tile, paints or any other light industry.

Grundy Center—A splendid location for canning factory, or beet sugar industry as beet culture could be profitably engaged in at this place.

GUTHRIE COUNTY.

Jamaica—Abundance of the best water for manufacturing and steam purposes. Plenty of timber that could be worked up in various ways. Good shipping facilities, and substantial inducements offered to industries locating here. Coal is plentiful and cheap.

HAMILTON COUNTY.

Webster City—Exceptional advantages for manufacturing of all kinds; water and coal cheap, plentiful and of the best quality; transportation facilities the best, and an exceptionally rich and productive soil.

Ellsworth—A brick and tile factory, broom factory and a canning factory wanted, and which would be assisted by citizens to get same established.

HANCOCK COUNTY.

Britt—Brick and tile works, flax or tow mill wanted and all kinds of wholesale and retail stores, and professional men would find excellent openings here; best railroad facilities, prosperous surrounding territory which would respond quickly by assisting new industries or business of any character.

HARDIN COUNTY.

Eldora—The finest of clay abounds in this locality, suitable for sewer pipes, brick, tile and pottery; the industry is already a large one here but is capable of unlimited extension. Substantial encouragement will be extended to new comers. A canning factory is an immediate necessity.

Hubbard—Where is the compensation for all this work?

Union—There are the finest beds of clay here, suitable for brick, tile or potteries.

Iowa Falls—Many advantages abound of interest to prospective manufacturers. Unlimited water supply of best quality, building stone and fire clay; sugar beet factories needed at once; the beets grown here are of the finest quality and are sent out of

the state to foreign beet sugar factories. Lime stone deposits waiting for development.

HARRISON COUNTY.

Little Sioux—Water power excellent. Lower freight rates wanted before manufacturers could successfully compete with Council Bluffs or Omaha.

Missouri Valley—Splendid opening for an elevator and cleaning mill, excellent railroad point for distribution. Beet sugar factory and foundry wanted.

Logan—Very superior advantages for a thriving manufacturing center. The finest lime stone quarries in the world are situated here. Splendid groves of hard wood, consisting of oak, walnut, etc. A variety of industries could be operated here with profit, viz: Woolen mills, wooden ware, boots and shoes, brick and tile works. The clay in this vicinity is of a very superior quality. The Boyer river would furnish cheap motive power. Extract from the late senator Bolter's letter.

HENRY COUNTY.

Salem—Gone to seed.

Winfield—A canning factory wanted immediately. A mass meeting of citizens was called to consider the enquiry and a committee appointed to secure pledges with the result that substantial aid was guaranteed to any suitable industry that could be located here; especially one that would use the farm product.

HOWARD COUNTY.

Cresco—Natural advantages of a superior kind for the location of beet sugar and canning factories. An electric line needed at once, connecting Waukon, Decorah, Cresco, Riceville, Mason City, etc. Such an enterprise would be a very profitable undertaking.

Elma—Substantial inducements will be made for the installation of a canning factory, or any industry that will employ idle labor and build up the town.

HUMBOLDT COUNTY.

Bode—A very excellent quality of clay is waiting development. A canning factory is also wanted.

Humboldt—Furniture factory, canning factory, brick and tile works are all wanted here, and an excellent opportunity is open to the persons starting them.

Renwick—An advantageous opportunity is open for a first-class general merchandise store.

IDA COUNTY.

Ida Grove—This locality will extend a substantial welcome to any suitable industry locating here, and will support it with a vim.

IOWA COUNTY.

Victor—Elegant beds of clay, suitable for fine pressed brick and tile making, and an exceptional good market for the product.

JASPER COUNTY.

Newton—Every inducement is offered to new industries locating here, water supply unlimited and of the finest quality, best of steam coal cheap. City owns electric power plant, and will furnish motive power at the lowest rates. No prospective industry can afford to overlook the opportunities offered.

JEFFERSON COUNTY.

Fairfield—The best of locations are offered here for manufacturing enterprises. Fuel and water is of the best, and in unlimited quantities. The people will offer the most liberal assistance to new enterprises. Shipping facilities are good, and additional sidetracks can be built.

JOHNSON COUNTY.

Iowa City—Natural advantages for the successful operation of canning factories, beet sugar factories, packing houses and woolen mills, and every assistance will be rendered to new institutions.

Oxford—Excellent beds of clay exist here, and a brick and tile factory is badly wanted, and a grist mill would do well. Railroad accommodations of the best.

JONES COUNTY.

Wyoming—There is an idle canning factory here equipped with modern machinery, which could be purchased cheap to the person or company that would locate here and operate it.

Monticello—Will give every inducement to enterprises that will consume the products of the farm. The creamery interests are well developed here.

KEOKUK COUNTY.

Keota—Offers especially good advantages for the establishment of a canning factory, and an oat meal mill.

Kennick—Good opportunities are open here for the successful operation of a creamery, brick and tile works. Good clothing store wanted together with a lumber yard and a hotel.

What Cheer—Natural advantages abound here for the successful operation of any manufacturing industry. Coal and water is plentiful and of the finest quality. Very fine beds of clay, suitable for fire brick or pottery ware is awaiting development.

LEE COUNTY.

Keokuk—Every advantage exists here for successful manufacturing, transportation by rail and boat sufficient for any requirements, good contributing territory, cheap rents, peaceful labor. Parties interested in the development of water power will be afforded every assistance, franchises for waterpower development having passed both houses of congress. This cheap power will make this location one of the most choice of any city in the west for new industries.

Fort Madison—A new packing house with modern equipment is ready for capable, responsible parties to operate. Splendid factory sites open and transportation facilities of the best. Every reasonable assistance given to new industries.

LINN COUNTY.

Marion—Wanted, a department store, and any enterprise locating here would be generously assisted and supported. Railroad accommodations unexcelled.

Cedar Rapids—While many improvements have been made and new industries have been established here, the field is still good for more; furniture, agricultural implements, pumps, wind-mills, milling, and every other kind of industry. Material assistance to new industries will be given.

Mt. Vernon—Magnificent stone quarries and good sites make this an ideal place for manufacturing; the best of building material being plentiful and cheap.

LUCAS COUNTY.

Chariton—A canning factory and a meat packing establishment are the most immediate necessities with a street car line to

Cleveland; city water works are wanted together with a sash, door and planing mill, brick and tile works and a normal school or college.

LYON COUNTY.

Alvord—An excellent opening for a creamery and small flour and grist mill.

Larchwood—Our natural advantages are of the kind that utilizes the products of the farm. We need a flour and grist mill, a cheese factory and a creamery, and a good general store would be generously supported.

MADISON COUNTY.

Winterset—We want a canning factory badly.

Truro—A beet sugar factory and brick and tile works could be conducted here to great advantage.

MAHASKA COUNTY.

Oskaloosa—If cheap fuel is an incentive to new industries then Oskaloosa is amply supplied, and a most substantial welcome will be accorded to prospective manufacturers and capitalists. Direct connection with three trunk lines of railroads, and a loyal community to local interests.

New Sharon—Industries are being attracted on account of recent municipal improvements. A canning factory and flour mill are now wanted.

MARION COUNTY.

Knoxville—Well situated for manufacturing of all kinds; heavier the better. Coal and water is found here in inexhaustible quantities and the best quality. Good, accommodating railroads.

Pella—Wanted, a beet sugar factory and a water works system. To anyone seeking an economical location the people of Pella say: "Pay us a visit and we will make it worth your while for the effort and patronize the industry that is established."

MARSHALL COUNTY.

Marshalltown—Your inquiry is certainly an important and aggressive one and must do good. Marshalltown is the king point to locate any factory whose products can be used in an agricultural community. Our railroad facilities are first-class.

Go on with the good work, and interest factory owners not only for this city but for the state.

MITCHELL COUNTY.

Osage—A splendid water power near here, which could be obtained for a song. We need brick yards, flax mills, paper mills. Have finest kind of clay and stone. Any business enterprise locating here could not help but be successful from the start.

MONONA COUNTY.

Ute—We need a flour and grist mill.

MONROE COUNTY.

Albia—No place in the west offers such positive inducements for factory location as this; fuel the best and the cheapest, quantity unlimited. Do your best to attract capital to this inviting and profitable field.

MONTGOMERY COUNTY.

Stanton—We need the following and can support them: Brick yard, flour mill, canning factory, beet sugar factory, woolen mills, foundry and machine shop, cigar factory, agricultural implement factory, a packing house, a starch factory, a steam laundry, an oatmeal mill and numerous other industries.

Red Oak—Natural resources are good: Building stone, fine fire clay, good water supply and a very productive soil; we have good coal here at reasonable depth which has not yet been worked. A canning factory, starch mill, paper mill and other similar industries would prosper here and responsible parties could get substantial assistance. Our new electric power company is prepared to furnish power to all users. Our principal asset is our cleanliness, both physically and morally.

Villisca—Our citizens would be glad to assist any good enterprise by bonus or sites for buildings. A canning factory is badly needed.

Elliott—Fine shipping point and good location for manufacturing; our citizens are ready to encourage new industries. We need a flour mill, drug store, harness shop, lumber yard, machine shop and many others could be profitably located here.

MUSCATINE COUNTY.

Muscatine—Any good industry that wants to flourish and secure loyal support of a vigorous, loyal community cannot afford to ignore Muscatine as a location, especially manufacturers of finished lumber articles.

O'BRIEN COUNTY.

Paullina—Golden opportunities are awaiting the investors in this locality. In the beet sugar industry, first the cultivation of our productive soil towards that end, and then use the product after locally refining it. A canning factory is also needed.

Sheldon—The best location for utilizing cereal products through manufacturing processes.

OSCEOLA COUNTY.

Sibley—"Our farmers are prosperous and our business men have no offer for promoters seeking new lines of industry," from one point of view. Another states that "the locality affords advantages for an academy, a lumber yard and an oat-meal mill, or a beet sugar factory, or any other industry that will utilize the products of the richest agricultural territory."

PAGE COUNTY.

Blanchard—We need a cheese factory or creamery.

Clarinda—We have some coal and plenty of water. Our people would co-operate with parties who would open a canning factory or other plant that would utilize our agricultural products. Shipping facilities are excellent, and taken altogether it is an ideal location for new industries.

Shenandoah—Almost everything of a manufactured nature is shipped here, which is essentially wrong; we need a wholesale grocery, a poultry packing establishment, a cold storage plant. An ice manufactory is needed. The ice we get is poor and filthy and the cause of considerable sickness. Another brick and tile plant would do well, and so would an independent lumber yard. This is a sure corn crop country and we need an industry that will make implements for its cultivation and others that will convert the product into marketable articles. A foundry and machine shop is especially wanted.

PALO ALTO COUNTY.

West Bend—A very desirable location for a beet sugar factory or tow mill that will change the marvelous productivity of our soil into other marketable commodities. Our people can be depended on to encourage every commendable enterprise.

Emmetsburg—We have idle a well equipped packing house. It can be purchased cheap. It could get support from a radius of 150 miles. It is admirably adapted for co-operative efforts.

POCAHONTAS COUNTY.

Rolfe—We stand ready to give a liberal bonus to any enterprise that will locate here. Our shipping facilities are of the best; we have easy access to fuel. A brick yard and a canning factory could be conducted with profit here.

POLK COUNTY.

OFFICERS OF THE COMMERCIAL EXCHANGE.

Natural advantages possessed by Des Moines for the profitable location of new industries.

Cheap and abundant coal.

The best of water for steam purposes.

Exceptionally good railroad facilities.

Surrounded by a rich farming district.

Centrally located, as regards territory naturally tributary.

Abundance of clays for brick, tile, pottery, etc.

A great insurance centre.

A great banking centre.

A city of homes and schools, etc., etc.

The fact that there are eighty-five churches in this city gives assurance that Des Moines is, morally speaking, a desirable place of residence.

Des Moines is the third city in the United States in the storage, handling and distribution of farm machinery. Notwithstanding this fact 98 per cent. of the implements used by our farmers are made in adjoining states and shipped into Iowa by the car load, for sale and distribution. In other words, having cheap and abundant coal, much of the raw material, and the best market in the world, Iowa makes but 2 per cent. of the goods consumed in this direction.

The list of Industries which ought to thrive in Iowa, and which follows, is headed with "Implement factories," insomuch as they logically should be made near the point of consumption.

Industries needed in Des Moines and which logically belong here and should thrive.

Factories for farm machinery of all kinds, mowers, reapers, plows, harrows, corn planters, seeders, etc., etc.

Farm wagons.

Potteries; clays of all kinds abundant.

Hollow building brick, both glazed and rough.

Mining tools.

Canning establishments for tomatoes, sweet corn, etc.

Glucose factory.

Oat meal mills.

Strawboard factory.

Woven wire fence factory.

Paper mill.

Celulose factories, to work up our corn stalks.

Pulp mill.

Rolling mill, to use up our immense supply of scrap iron, can be worked into merchant bar, etc.

Malleable iron foundry.

Starch works—one factory here—room for more.

Furniture factories.

Linseed oil mill—one factory here—room for more.

Shoe factories.

Mixed paint factories.

There might also be added to the above important list a few industries which ought to thrive here.

Church pipe organ factory.

Piano factory.

Freight and passenger elevator factory.

Stove works.

Wood box factory.

Refrigerators.

Soda water apparatus.

Smelter, etc.

Altoona—This locality is in need of a hotel and more retail stores.

POTTAWATTAMIE COUNTY.

Oakland—An excellent opening here for any branch of the milling industry.

POWESHEIK COUNTY.

Grinnell—Good railroad center, would welcome any new industry and give it substantial encouragement.

RINGGOLD COUNTY.

Knowlton—Investors are cordially invited to personally inspect

this locality; a large stock of general merchandise is on the market, and a drug store, harness shop and a first class meat market is wanted here.

Delphos—Would appreciate a canning factory locating here.

Tingley—Plenty of natural advantages exist here for the favorable operation of creameries, cheese factories, canning factories, woolen mills and the people are so desirous of getting such industries established that they would aid in every way possible to make them a success. A first class flour mill is needed.

SAC COUNTY.

Sac City—A fine opening here for a good hotel and an up to date brick yard would do well; elegant clay here.

Lake View—Wanted a first class hotel, a lawyer, and a tailor. Our elegant summer resort needs improving.

SCOTT COUNTY.

Davenport—Possesses every advantage for successful industries. Cheap fuel, low freight rates, superb shipping facilities, fine water supply and power, plenty of skilled labor, good sites for manufacturing purposes at low prices, and has the reputation of being the healthiest locality in the country.

SHELBY COUNTY.

Shelby—We are admirably located for a canning factory and a brick yard; further information cheerfully given.

Harlan—A dry goods and grocery jobbing establishment is badly needed here, good territory and good railroad connections.

STORY COUNTY.

Roland—Natural advantages the best for a canning factory.

Slater—A butter tub factory would find this an excellent location; our citizens would aid in a financial way to make it successful; our railroad connections make this a good shipping point.

Mamell—Our citizens would offer good inducements to parties putting up a good canning factory here. We need several industries to employ our surplus labor. A good steam laundry and an electric light plant would fill our needs admirably.

Oslo—We have a good opening for a first class clothing store.

TAMA COUNTY.

Traer—Finest of shipping facilities. Inducements of a

substantial character offered to new industries; best of water and electric power furnished at half rates. There is no better location in state.

Tama—Any line of industry locating here will be gratified, a splendid wood working machinery plant for sale cheap, providing manufacturing will be done here.

TAYLOR COUNTY.

Bedford—This excellent agricultural region will offer big inducements to a canning factory locating here.

Gravity—Our community is growing rapidly and now needs a good brick and stone mason, bakery, good brick yard together with a canning factory.

UNION COUNTY.

Oreston—A flour and grist mill would be a paying investment from the start; and would be encouraged. The finest of wools are grown in this territory and woolen manufacturing would be a good business to introduce here. The best natural advantages. Here is plenty of labor and a good supply of water.

VAN BUREN COUNTY.

Cantril—We have excellent location here for a pickling or preserving factory, a pressed brick manufactory, splendid clay for the purpose. A handle factory and a hardware store could also be located to advantage to all concerned.

WAPELLO COUNTY.

Eldon—Every advantage exists here for manufacturing industries on a large scale; coal and water of the best quality and limitless quantity; the timber supply is abundant, shipping connections the best, labor plentiful. City owns its modern water and electric lighting plant.

Ottumwa—Is peculiarly well situated for manufacturing, the three great requisites—coal, sand and water—being plentiful here. A straw paper industry is wanted. Starch and linseed oil were formerly good industries here, and the vacant buildings could be utilized again for those industries. or obtained cheap for others. In fact, no kind of manufacturing would be amiss in Ottumwa. Railroad facilities good, and a fine contributory territory.

WARREN COUNTY.

Indianola—The brick industry could be profitably maintained here.

WASHINGTON COUNTY.

Washington—Has many advantages for an industrial population—low rate of mortality, excellent sewage system, low rate of taxation, high grade of morality, water system owned by city, will make it interesting to prospective manufacturers.

Riverside—An electric lighting plant, a local telephone system and city water-works are the first immediate necessities here.

Brignton—Well supplied with building materials, and our locality is suited to the manufacture of corn products and cereals; good water, good clay.

Wellman—A good brick yard is wanted here. We have splendid clay.

WEBSTER COUNTY.

Fort Dodge—Sugar beets can be grown here successfully, and a beet sugar factory is wanted. Many industries have been started here recently, but there is still room for more. Unlimited quantities of coal, wood, stone, clay and water, and the finest of railroad facilities. The immediate necessities are a shirt and overall factory and a bag factory. Liberal inducements offered to new industries.

Dayton—Every support would be given a first-class flouring mill and a canning factory; an ideal place for such institutions.

WINNEBAGO COUNTY.

Forest City—Splendid opening here for a pickling establishment and a beet sugar refinery, and no better opportunities exist than here for a foundry and machine shop, business college, planing mill, and brick and tile yard. A central steam-heating plant is also desired.

Buffalo Center—A canning factory and brick and tile yard are wanted, and particularly a first-class lawyer.

Rake—Every opportunity afforded for new business and industries, retail stores. Professional men of all kinds will be made welcome.

WINNESHEIK COUNTY.

Calmar—The finest of railroad facilities offer extraordinary

inducements for the location of varied industries. A first-class clothing store is wanted at once.

WOODBURY COUNTY.

Moiville—We want and will assist in maintaining a canning factory and flouring mill.

Sioux City—Our main advantages lie in the splendid location Sioux City has for distributing over a wide area. Light or heavy manufacturing could be successfully carried on, especially a tannery and boot and shoe factory, woolen mill and every associate industry which uses animal products for raw material. Unstinted support will be given such manufacturers by our people.

SPECIAL REMARKS.

This important phase of the Labor Commissioner's duties is treated fully in the letter of transmittal.

MANUAL TRAINING IN IOWA.

MANUAL TRAINING.

For the purpose of complying with the law, Sec. 2470:

The Commissioner shall include in his biennial report what progress has been made with schools now in operation for the instruction of students in the mechanic arts, and what systems have been found the most practical, with details thereof.

I prepared the following letter:

Will you kindly inform this bureau what measures have been taken to establish manual training in your schools, and any other information relating to the progress of your work that you would deem to be of public interest, and of value for our report?

We sent the foregoing to all the county superintendents and to the superintendents of city schools, and I give their replies in full.

I regret so little has been, and is being done, but I am of the opinion that the public is becoming awakened to the importance of manual training in the schools.

THE FOLLOWING REPLIES ARE FROM COUNTY SUPERINTENDENTS:

ADAIR COUNTY.

There has been nothing in our county along the line of manual training.

ALLAMAKEE COUNTY.

Our county has taken no steps toward manual training schools, or classes, as yet. I might say that all our schools (131) are graded and classified. We use the "Welch system". I can truthfully say that our schools are gaining both in interest and class of work.

APPANOOSE COUNTY.

There have been no measures taken in this county along the lines of manual training.

BLACKHAWK COUNTY.

Regarding manual training in this county I would say there is nothing being done in the way of manual training in the public schools. Three graded schools, Cedar Falls, East Waterloo, and West Waterloo, have special teachers for physical culture in connection with all grades.

BUENA VISTA COUNTY.

None of the schools in this county have manual training.

CALHOUN COUNTY—ROCKWELL CITY.

No measures have been taken in this county along the lines of manual training.

CASS COUNTY.

Do not know of anything unless physical culture. Physical culture is being taught more systematically in our schools.

CEDAR COUNTY.

Would say that so far as I have learned nothing is done in those lines.

CHICKASAW COUNTY.

No steps along the line mentioned.

CLAYTON COUNTY.

Nothing has been done in manual training.

CLINTON COUNTY.

No effort has been made that I know of toward introducing manual training.

CRAWFORD COUNTY.

We have no report to make.

DALLAS COUNTY.

I am sorry to say that the schools of this county have been doing nothing whatever in the line of work for which information is asked.

DAVIS COUNTY.

Nothing has been done in this county concerning manual training in the schools.

DECATUR COUNTY.

Concerning manual training in the public schools I will say that nothing has been done in that direction yet.

DICKINSON COUNTY.

Practically nothing has been done.

EMMET COUNTY.

Know of nothing in the line of manual training, strictly speaking, being done in the schools of this county. Our towns are too new and it may be several years before we can hope to reach the stage of manual training.

FAYETTE COUNTY.

We feel the need of manual training, but have made no definite progress along that line.

FLOYD COUNTY.

No manual training is done in any school in the county.

GREENE COUNTY.

There is a tendency on the part of school officers and teachers to place more stress on manual training in our schools. While nothing of any particular importance has been done in a practical way, yet I believe many of our progressive teachers are doing the best they can under existing circumstances to develop in the pupil a love for physical labor.

Our teachers, and I believe parents too, are coming to recognize more and more the folly of holding out to the child the idea that to be eminent he must train for the professions and neglect, possibly look down upon, the trades or physical labor.

This is step in the right direction. and hope this feeling may strengthen until all will recognize the training of the hand to be necessary in the education of every child.

HANCOCK COUNTY.

Nothing has been done along the line of manual training in our schools that is worthy of mention. Garner schools have a gymnasium on a small scale.

HARDIN COUNTY.

None.

HENRY COUNTY.

In the line of manual training there is nothing taught except writing, drawing, and some kindergarten work, and these are well taught.

In several schools they make pulp maps and use sand tables but none are using tools or doing any work beyond this. They are taught to use apparatus already provided but not to make any.

A special effort is being made to improve the spelling and use of English in our schools, and we have each year (1900 and 1901) a school exhibit in which any work the children can do will be accepted.

HOWARD COUNTY.

Think nothing here done is what you desire reported.

HUMBOLDT COUNTY.

Physical culture and general athletic work is quite in our larger graded schools. In the mechanical arts only a little is being done in two high schools.

JACKSON COUNTY.

I know of no distinctively manual training in any of our public schools in the county. So many "fads" along the intellectual (?) lines, leave but little opportunity for the eminently practical. The schools, under modern legislation and so-called leadership, are fast growing away from the people.

JEFFERSON COUNTY.

No measures have been taken along the line of manual training.

KEOKUK COUNTY.

Very little has been done in this county along the line of manual training in the public schools. As county superintendent, have urged some of the leading educators, as well as school boards, to take some action. One thing, we do not have any large towns in the county, so we cannot get as prompt action as we could if we had larger schools. However, the sentiment is growing.

KOSSUTH COUNTY.

Have no knowledge of any measures being taken in this county along the lines of manual training. Uniform text books and consolidation are most important.

LOUISA COUNTY.

There has been nothing done along the line of manual training in this county.

LUCAS COUNTY.

As yet our school boards have taken no action toward establishing manual training schools. There is talk of it for the Chariton schools, but no provision is made for it so far.

LYONS COUNTY.

There has been practically nothing done in this county along the line of manual training.

MADISON COUNTY.

There is nothing done along the lines of manual training. The work of the schools in this county is generally good and the work is in closer touch with nature and the sciences than formally.

MAHASKA COUNTY.

There has not been much in that line. I do not know of anything. There is what is called an industrial school, managed by some of the women of the town, who look after charity. It is not in connection with the public schools. They teach sewing, patching, etc.

MARION COUNTY.

Am sorry to say that the schools of our county are doing practically nothing along the line of manual training.

MILLS COUNTY.

I have no graded schools in this county in which any work in manual training is done.

MITCHELL COUNTY.

Nothing has been done in the matter in this county.

MONONA COUNTY.

Nothing special along the line of manual training has been done in this county excepting what little is done in connection with the study of drawing.

MONROE COUNTY.

There has been no instruction in the Mechanic arts in this county.

OSCEOLA COUNTY.

Nothing has been done in the schools of this county along the line of manual training. I am heartily in favor of this work and would appreciate information along this line.

PAGE COUNTY.

Indolence and disobedience are two evils that are arresting the moral and educational development of the youth of this land more than all other evils combined. There must be something done to provide manual labor, manual training for the youth of our towns, villages and cities. Business men go to their places of business in the morning before the children are up and return home at night after they have gone to bed. Hence the children are in the hands of the mother when not in school. The girls as a rule are properly cared for while the boys are turned loose on the street to misuse their time in debauchery. We may pride ourselves on good schools and efficient teachers as much as we please, but we will never reach the better parts of the child until we develop the industrial nature of his being; until we train his eye and hand as well as his brain. And again, this is a day for quantity rather than for quality in education. The child undervalues the common branches and hastens to part company with them. He wants to get into the higher branches. Reading, writing, spelling and arithmetic are beneath his dignity. He wants to study Latin, French, German or any other, but the English language. He wants to study higher mathematics before he knows anything about arithmetic. He must get through the book in a given time. He thinks more about getting through the book than he does about the principles in the book.

I consider that the common branches are the foundation stones for the super structure of education, and the child should be required to master them before being passed on. I am working to that end indicated above and am trying to get teachers and parents to see as I see in this matter, and I am glad to say that they are beginning to do so.

PALO ALTO COUNTY.

We have done nothing that would properly belong to your report.

We have made our system of books uniform, adopted and are carrying out a course of study. Put in \$3,200 worth of library books in the past year, and the quality of our work has greatly improved. Our attendance is 18 per cent. better this year than last, but nothing done in manual training.

PLYMOUTH COUNTY.

I have to report that not much has been attempted along this line. Some work has been done incidentally, but no regular and systematic effort has been made.

POCAHONTAS COUNTY.

I know of nothing that would be of interest to your report.

POLK COUNTY.

Would say that we have had manual training in the West Des Moines schools for a number of years. Some experimenting is being done this year in some of the lower grades with a view of establishing manual training in the lower grades in the different ward schools.

RINGGOLD COUNTY.

Nothing has been done along the line of manual training in this county.

SCOTT COUNTY.

Nothing has been done in the line of manual training outside of the city of Davenport.

SHELBY COUNTY.

None whatever.

SIOUX COUNTY.

No such training is found in any school to my personal or official knowledge.

STORY COUNTY.

Nothing definite has been introduced into the schools of Story county with reference to manual training. The children in some of the primary grades are taught to use the needle and do some paper cutting, while drawing is given a prominent place all through the grades, being associated with botany and physics in upper grades.

TAMA COUNTY.

Will say that nothing has been done in our county along the lines of manual training.

TAYLOR COUNTY.

There has been nothing done in manual training in the schools of this county.

WAPELLO COUNTY.

There is no progress in the line of manual training or mechanic arts. There is no attempt made in the county, so far as I am able to ascertain. I do not have anything in that nature that would come within the scope of your report. I am sorry that such is the case. I wish that industrial might be emphasized in the state of Iowa. It is a logical, rational basis of education and the exigencies and demands of the times must be felt ere long in this respect.

WASHINGTON COUNTY.

Nothing special has been done in our county. We have no cities, as is well known.

WAYNE COUNTY.

Manual training has never been introduced into the schools of this county. There is no feature of any particular interest connected with the progress of our schools. Just at present a special effort is being made to make the new

school library law a success in this county and I am gratified at the way the boards are responding to my effort.

WEBSTER COUNTY.

Nothing is being done along these lines.

WINNEBAGO COUNTY.

I must say that "manual training," in the full sense of the words, is sadly neglected in the schools of this county. Outside of the making of apparatus for experiments by pupils in the high school, and clay modeling, and other similar minor exercises in the lower grades, nothing has been done to further manual training. I deplore this condition, but hope to be able to report more favorably next year.

WINNESHIEK COUNTY.

I am forced to say that our county has not as yet introduced any form of manual training into her schools. Perhaps the fact that we have recently completed three new school buildings, of modern design, may be of some interest. These buildings are 24 x 30; side and rear lighting; basement heating apparatus, and ventilating shafts and registers arranged in accordance with the latest plans and specifications of the best architects. The recent library enactment is being pushed and most of the boards are glad to see some move of that sort pushed. We have already selected the books for several of the townships and there is every reason to think that the library will be a grand thing for the people of rural communities as well as the children who attend school.

WORTH COUNTY.

There has not been any measures taken along the lines of manual training in this county.

THE FOLLOWING REPLIES ARE FROM SUPERINTENDENTS OF CITY SCHOOLS.

APPANOOSE COUNTY—CENTERVILLE.

Centerville has never had such instruction in her schools. I have recommended its introduction to the board as soon as their financial interests will allow. Experimental work in the sciences is much improved; a laboratory for such work provided recently and we expect to introduce drawing during the present year, after holidays. These steps prepare the way for manual training.

BLACKHAWK COUNTY—EAST WATERLOO.

In our school we teach mechanical drawing, but not manual training. Investigations are being made as to the feasibility of introducing manual training, since we have a room that could be utilized for that purpose. We would be pleased to receive any literature that would give us information in this line.

WEST WATERLOO.

We have taken no steps toward establishing a manual training depart-

ment in our schools. Have not the room until we can have an additional building.

BOONE COUNTY—BOONE.

We do not have manual training, I am sorry to say.

BUCHANAN COUNTY—INDEPENDENCE.

So far nothing has been done in the way of manual training in our public schools. Of course we are continually trying to make our school work more and more practical.

BUENA VISTA COUNTY—STORM LAKE.

We have no manual training, but drawing and laboratory and fieldwork in sciences.

CERRO GORDO COUNTY—MASON CITY.

Our manual training department has been in operation for eight years.

We teach carpentry, wood-turning, mechanical and architectural drawing to pupils in grades seven to twelve. The most at present is confined to boys, and is optional with them.

We enroll about 150 boys, who do from one-half to one hour's work each day.

The boys are very fond of the work, and they show the results in their other work, especially in mathematical studies. They rapidly develop in painstaking accuracy, independent action; foresight, courage, quick observation, intense interest and all the qualities of manhood.

Each boy progresses as fast as he can develop the proper skill. This is a strong incentive to ambitious boys. Only one exercise of a kind is made, so that there is nothing to depreciate the value of the work as an educational means. The shop and the factory teach nothing, because one thing is constantly repeated. The manual training school is strictly a school for constant progress and growth.

CHEROKEE COUNTY—CHEROKEE.

Our schools have taken no steps toward manual training.

CLINTON COUNTY—CLINTON.

Nothing has been done as yet to establish manual training here, but there is a strong sentiment in favor of it.

DELAWARE COUNTY—MANCHESTER.

No measures have been taken to establish manual training in our schools. At present we are not prepared for it, so far as room is concerned.

DES MOINES COUNTY—BURLINGTON.

We have no manual training in our city schools. The expense of introduction and support is the principal cause.

DUBUQUE COUNTY—DUBUQUE.

We have not yet introduced manual training. We have discussed it several times and the general opinion is that it will find its way into our

schools in the near future. We are doing some work in drawing with this end in view.

FLOYD COUNTY—CHARLES CITY.

We do not have manual training in our schools, although I should be pleased to have it

GUTHRIE COUNTY—STUART.

We have no manual training department in our public schools.

HAMILTON COUNTY—WEBSTER CITY.

Nothing is done in these schools towards teaching the mechanic arts.

HARDIN COUNTY—ELDORA.

We have no manual training except such as comes in incidentally in the primary grades in paper folding, weaving of forms in mats of paper, etc., and such normal training as is of necessity involved in learning to write and draw. In the upper grades we get some work of this nature in physics, botany and geometry. I inclose herewith our course of study, which I trust will answer all questions outside of normal training branches. I shall be glad to do anything I can to further this movement.

HARRISON COUNTY—MISSOURI VALLEY.

We have no facilities for shop work of any kind; but we are emphasizing more each year the many school occupations that involve hand work and that bring into play the constructive faculties. Thus, we have drawing, clay modeling, paper cutting, stick laying, writing, some sewing in primary grades, a bit of whittling, and much measuring, handling and comparing of objects. To these we are adding a little work in water colors.

Most of our pupils are familiar with many phases of railroad construction and operation. The railroad machinshops here are quite extensive, and nearly all our families are represented among the laborers there or in some other form of railroad service. Many of our boys go to the shops to work as soon as they are old enough.

I am satisfied that the introduction of bench work for boys and girls and sewing, cooking, and other forms of domestic art for others, would strengthen our educational work and make it of far greater worth to many of our that people. That is, I believe we would get better intellectual and moral results in many cases through a larger dependence upon manual activities. The cost of introducing and maintaining such courses is all that postpones it here.

JASPER COUNTY—NEWTON-

Manual training is not undertaken in the Newton schools.

JOHNSON COUNTY—IOWA CITY.

We have a manual training department in the Iowa City schools. Pupils from the fifth to twelfth grades take the work. There are 350 pupils now carrying this work. Both boys and girls are admitted to the classes. The work has proven very helpful and stimulating to the children.

KOSSUTH COUNTY—ALGONA.

We have no regular manual training. We have drawing in all grades and much sense training in the primary departments.

LEE COUNTY—FORT MADISON.

Nothing along the line suggested has been undertaken.

LEE COUNTY—KEOKUK.

We have made just a beginning for the work this year. The introduction of card board construction in the third year.

LYON COUNTY—ROCK RAPIDS.

No measures have been taken looking forward to the introduction of manual training in our schools.

MAHASKA COUNTY—OSKALOOSA.

The only manual training connected with our schools is under the direction of a committee of ladies who meet once a week with about one hundred children to give them instructions in sewing. The school board purchases material and the ladies do the work gratuitously. The pupils are nearly all girls.

MARSHALL COUNTY—MARSHALLTOWN.

We are doing nothing along the line of manual training at present.

MILLS COUNTY—GLENWOOD.

STATE INSTITUTION.

This institution has for many years included manual training as a part of the education of the inmates under its care. The equipment for such training now includes, for the boys, brickmaking, farming, gardening, mattress making, shoe making and cobbling, carpentry and wood turning, type setting and printing, and bread baking.

For the girls, dress making, plain sewing, laundering (ironing), cooking, general domestic work, and type setting.

It should be borne in mind, however, that very few inmates of the institution become proficient in any handicraft and that practically none become self supporting in the ordinary use of the term, and that all require intelligent supervision and direction during their labor. Their capabilities are in every case limited and fall short of the normal. *

The following are the statistics of the various occupations at which the children have been engaged for the year ending June 30, 1900.

(NOTE.—All products of the various industries are used in the economy of the institution.)

BRICK MAKING.

Number of boys instructed.....	30
Product (common slap brick).....	595,000

FARMING AND GARDENING

Number boys instructed.....	33
-----------------------------	----

Number of acres	400
Products, total value	\$13,418.14

MATTRESS MAKING.

Number boys instructed	3
------------------------------	---

SHOE MAKING AND COBBLING.

Number boys instructed	5
Products: New shoes made, pairs	21
Old shoes repaired	2,607

CARPENTRY AND WOOD TURNING.

Number boys instructed	24
------------------------------	----

TYPE SETTING AND PRINTING.

Number boys instructed	2
Number girls instructed	2

BREAD BAKING

Number boys instructed	2
------------------------------	---

PLAIN SEWING, HAND.

Number girls instructed	50
-------------------------------	----

DRESSMAKING.

Number girls instructed	2
-------------------------------	---

LAUNDRY WORK, IRONING.

Number girls instructed	30
-------------------------------	----

COOKING.

Number instructed	8
-------------------------	---

DOMESTIC WORK.

Number girls instructed	50
-------------------------------	----

MONTGOMERY COUNTY—RED OAK.

Nothing beyond writing and drawing. Nothing has been done in manual training, proper.

MUSCATINE COUNTY.

We have rooms in our new high school building suitable for manual training, but up to the present almost nothing has been done to start the work. A bench and one set of tools is all we have and there is no regular systematic work done with these. At this time there does not seem any immediate prospect of organized work. I am heartily in favor of some elementary instruction and practice in manual training.

O'BRIEN COUNTY—SHELDON, IOWA.

I will say that we have no manual training in our schools except in connection with our kindergarten department.

PAGE COUNTY—CLARINDA.

So far nothing has been done in regard to establishing manual training in our schools.

PAGE COUNTY—SHENANDOAH.

We have recently introduced drawing in our schools and have a drawing teacher. Under the direction of the superintendent teachers occasionally make exhibits of manual work done by pupils, including drawings, paper cuttings, modeling, whittling, sewing, cooking, and other manual work. No instruction is given, simply encouragement is given to manual training.

POLK COUNTY—DES MOINES.

CAPITAL PARK PUBLIC SCHOOLS.

As yet no steps have been taken to establish manual training in any of our schools.

POLK COUNTY—EAST DES MOINES SCHOOLS.

Manual training has not been established in these schools. Aside from the regular work the only hand work the pupils in these schools enjoy are free hand drawing and scissor cutting.

POLK COUNTY—WEST DES MOINES SCHOOLS.

In reply to yours of November 16th, manual training has been an integral part of the curriculum of the West Des Moines High School for six or eight years. We have there apparatus and machinery which have cost the district about four thousand dollars (\$4,000), and which is considered a complete manual training plant, for all wood work, including turning and wood carving. Since September, 1899, there have been placed in the grammar schools five complete outfits for Sloyd or elementary manual training work. Schools thus equipped are as follows:

Washington school, Crocker school, North High school, Lincoln school, and Elmwood school. Pupils in the sixth, seventh and eighth grades are allowed the privilege of taking this training. Those who desire to take manual training in the schools which have not yet been fitted with benches and tools are permitted to go to the High school once a week. No one is compelled to do the manual training work; it is entirely a matter of election. We have, however, a larger number of applicants to do the work than can be accommodated by our present facilities.

POWESHIEK COUNTY—GRINNELL.

We have no work in manual training, but are agitating the question.

SAC COUNTY—ODEBOLT.

In reply am sorry to say we are doing nothing here in manual training.

SCOTT COUNTY—DAVENPORT.

A cooking school was established for girls of our ninth grade and High school in 1888, and a manual training school for boys of the same grades in 1889. Both schools have continued to the present time with increasing popularity and success. Membership in either school is entirely optional. In the cooking school nearly all the girls of the ninth grade and sixty-four per cent of the girls of the High school took the lessons last year. In the manual training school the percentage of ninth grade boys in attendance was seventy-four, and of the High school boys, sixty-five. The length of the

course in each school is four years. Upon the completion each pupil is given a diploma in certification thereof.

The course in cooking embraces all kinds of kitchen work and dining room serving. Theory receives attention as well as practice.

The following is an abstract of the course in manual training:

First Year—Course in sloyd, with working drawings of all exercises.

Second Year—Geometrical problems, projections, working drawings, machine drawings (parts), bench work and turning.

Third Year—Isometric drawing, geometry, curves, cams, gears, carving, bench work and turning.

Fourth Year—Architectural drawing, linear perspective, pattern making, molding, color.

The course in drawing in the grades below the ninth is such as to require a good deal of hand construction work. We expect to add more of sloyd work in these grades soon.

TAYLOR COUNTY—BEDFORD.

No steps have as yet been taken preparatory to its introduction into our schools.

The only study we have that is related to it intimately is drawing.

I shall be glad when I can do something in the direction of manual training.

UNION COUNTY—CRESTON.

No measures have been taken in this city to establish manual training in the public schools. The nearest approach to manual training is in our kindergarten department. We have three kindergarten schools under the public school system. Interest is taken by our board and many of our citizens in the subject of manual training, and we are hopeful of establishing it, in some form, in the near future.

WAPELLO COUNTY—OTTUMWA.

The matter is being agitated, but nothing has been done.

WEBSTER COUNTY—FORT DODGE.

Nothing done in this line.

WOODBURY COUNTY—SIOUX CITY.

I have but little to report, as to what has been accomplished, but much that I might report as to what we hope will be accomplished in this direction.

Over eight years ago, it was my privilege and pleasure to make the following brief recommendation to our Board of Education:

Manual training in the form of drawing, paper cutting and pasting, clay modeling, carving, etc., has formed a part of our school course, and produced such excellent results, that we heartily recommend the extension of this line of work.

While there is a difference of opinion among leading educators as to the real value of that part of manual training, which has sometimes been termed "shop work," the sentiment is rapidly growing in its favor. The opposition to it has largely grown out of a misconception of its chief aim. Manual

training is not primarily introduced into the public schools for the purpose of developing skilled mechanics, but for the helpful, symmetrical development of all the pupil's powers.

The training of the muscles in this shaping and fashioning of the wood and iron, exercises a helpful, stimulating influence upon the mental and moral powers. The struggle with stubborn matter which develops and toughens muscular fibre. This contact with material forces generally develops a firmer mental grip, fosters stronger tenacity of purpose and tends to produce sturdier character.

I would therefore recommend that manual training be made a part of our high school course just as soon as our magnificent high school building is completed, and room can be made for the necessary tools and machinery.

The financial depression which followed, prevented the carrying out of those suggestions, as was intended. We are still without the machinery because of the expense, but are hoping to secure it ere long. There is no question but that active boys and girls, who now drift out of our schools because little opportunity is afforded for manual training, would, under such hand training, remain a longer time in our schools, and become more useful citizens.

WRIGHT COUNTY—EAGLE GROVE.

We are simply teaching the girls to darn and sew.

STRIKES IN IOWA.

STRIKES.

Realizing the need for definite, detailed data relative to strikes that have taken place in Iowa, we determined to secure the record of strikes for as long a period as possible as the information on this subject given in previous reports of the bureau was not complete.

The National Department of Labor, in its tenth annual report, gave an exhaustive record, with numerous summaries, of strikes in Iowa up to June 30th, 1894.

This strike record, now presented in the following tables, has been gathered in conjunction with the National Department of Labor, and on schedules conforming to those used by that department, as nearly as the industrial situation in Iowa permitted, and covers the period from June 30, 1894, to December 31, 1900.

Data, where possible, has been verified by employers and employees in all instances where issues joined.

In order that the reader may fully understand Table No. 1, reference is here called to the continuation of the same table on the next succeeding page, the marginal number on both pages corresponding to the same strike so recorded for each county in each year.

To make this table easily understood attention is directed to its two parts, viz: Table No. 1 part I and table No. 1 part II.

Taking, for illustration, the first strike recorded, marginal number one, took place in Appanoose county and was ordered by a labor organization "against the retention of three days' wages as a guaranty to continue work" the strike is known as a general one and embraced fifteen establishments or mines; it ended successfully for the employees and lasted ten days, the wage loss to the employees was \$4,000. They received no outside financial assistance; the employers loss is given as \$1,000.

Following this tabulation on the succeeding pages, marked Table No. 1, part II, and bearing the same marginal number 1, it will be seen that 380 males and no females were employed previous to the strike; the strike was undertaken for 380 persons, or all the males employed; there were 320 strikers and 320 persons thrown out of employment; at the termination of the strike no new

employees were engaged and none brought from other localities; all the strikers were reemployed; the hours of labor was not changed on account of the strike, sixty hours comprising the week's work previous to and at the termination of the strike.

This system has been maintained and can be readily understood by perusal of the balance of the table.

The next table No. 2 gives a combination summary of the strikes in counties where they occurred with the total summary of all strikes in all counties in the state for the year, as for instance —

Marginal number nineteen, shows that in the year 1899, five strikes occurred in Woodbury county, 103 employes struck in the interest of eighty-nine employes. Four of the strikes were ordered by labor organizations, and one was not ordered by a labor organization. Four of the strikes were successful, and one was a failure. Twelve establishments were involved, not any of which were closed. One hundred and thirty-eight days were lost and the employes loss in wages was \$2,684. Outside financial assistance was rendered to the strikers to the amount of \$196, and the employers loss amounted to \$10,200.

On the next line following a summary for the state is given the totals for the year 1899, showing that forty-nine strikes took place in nineteen counties. Four thousand, one hundred and ten employes engaged in these strikes for 3,524 employes. Twenty-six strikes were ordered by labor organizations and twenty-three strikes were not ordered by labor organizations. Twenty-six strikes were successful, three partially successful and twenty were failures. One hundred and forty-three establishments were involved and ninety-three of them were closed on account of such strikes. Eight hundred and twenty-six days were lost. The cost to employes on account of loss of wages was \$151,338. Outside financial assistance was rendered the strikers to the amount of \$3,801, and the loss to the employers was \$108,560.

This same system of tabulation has been followed for all the years, included, and can be readily understood.

Foot notes are freely appended to explain data other than schedule called for.

The next table No. 3 contains an additional summary which embraces all the industries in which strikes occurred for the period covered and the number of establishments involved each year, together with the total number of strikes in all establishments, for each year, showing a total of 831 strikes in that number of establishments for the six years and six months.

Strikes occurred in thirty-four counties of the state during this period as follows:

Allamakee.....	2	Lucas.....	2
Appanoose.....	181	Mahaska.....	19
Blackhawk.....	3	Marion.....	4
Boone.....	8	Marshall.....	1
Cedar.....	1	Monroe.....	19
Chickasaw.....	1	Montgomery.....	2
Clayton.....	1	Muscatine.....	13
Clinton.....	1	Palo Alto.....	1
Crawford.....	1	Polk.....	131
Des Moines.....	7	Pottawattomie.....	6
Dubuque.....	14	Poweshiek.....	1
Emmet.....	1	Scott.....	44
Fayette.....	1	Taylor.....	3
Jasper.....	2	Wapello.....	32
Keokuk.....	8	Wayne.....	1
Lee.....	1	Webster.....	25
Linn.....	13	Woodbury....	17

TABLE

Strikes in Iowa by counties, years and industries

Marginal number	OCCUPATION.	LOCALITY.	CAUSE OR OBJECT.
1894.			APPANOOSE
1	Miners and laborers.....	Mystic.....	Against retention of three days' wages as guaranty.....
			MAHASKA
2	Miners	Oskaloosa and vicinity	For the Oskaloosa scale, 80 cents in summer; \$1.00 in winter, per ton...
			MUSCATINE
3	Conductors and motormen, Street Railway	Muscatine	Against reduction of wages from \$40 to \$35 per month.....
			PALO ALTO
4	Cigar factory employees	Emmetsburg.	Against reduction of 20 per cent in wages.....
			POLK
5	Building laborers, teamsters, etc..	Des Moines....	Against reduction of wages.....
6	Miners.....	Des Moines....	For increase of 10c a ton for mining ..
7	Miners.....	Des Moines....	Against reduction from 90 cents to 75 cents per ton for mining.....
1895.			APPANOOSE
1	Miners.....	Centerville....	Against reduction from \$1.00 to 80 cents per ton for mining.....
2	Miners.....	Rathbun.....	Against reduction of wages to per ct.
3	Mine employees	Cincinnati....	Against discharge of employees, and discrimination
			BLACKHAWK
4	Tailors	Waterloo	For adoption of union rules and union scale.....
5	Tailors	Waterloo	For adoption of union rules and union scale.....

No. 1.—PART I.

from July, 1894, to 1900, inclusive.

Marginal number.	Ordered by labor organization.	Succeeded.	NUMBER OF ESTABLISHMENTS INVOLVED.		Beginning.	STRIKERS RE-EMPLOYED OR PLACES FILLED BY OTHERS.		EMPLOYEES'—		Loss of employers.
			Closed.	Not closed.		Date.	Days to date.	Wage loss.	Assistance.	
COUNTY.										
1	Yes	Yes	15		Aug. 8	Aug. 18, 1894	10	\$ 4,000		\$ 1,000
COUNTY										
2	Yes	No	12		July 1	July 30, 1894	20	54,000	\$ 5,000	20,000
COUNTY										
3	No	No	1		Dec. 27	Jan. 2, 1895	6	56		150
COUNTY.										
4	Yes	No	1		Nov. 21	Dec. 21, 1894	30	600	105	2,500
COUNTY										
5	No	Yes	1		Aug. 3	Aug. 5, 1894	2	600		
6	Yes	Yes	14		Nov. 1	Nov. 15, 1894	10	7,500		5,000
7	Yes	Yes	1		Nov. 12	Nov. 20, 1894	8	800		500
COUNTY										
1	Yes	No	1		Feb. 1	Feb. 11, 1895	10	1,875		1,000
2	No	No	2		Feb. 13	Feb. 16, 1895	3	3,000		1,000
3	Yes	Yes	1		Sept. 1	Oct. 16, 1895	45	2,500		500
COUNTY.										
4	Yes	No	1		March 20	April 10, 1895	21	75		50
5	Yes	No	1		April 1	April 21, 1895	20	200		250

TABLE

Strikes in Iowa by counties, years and industries

Marginal number.	OCCUPATION.	EMPLOYES BEFORE STRIKE.			EMPLOYES FOR WHOM STRIKE WAS UNDERTAKEN.			NO. OF STRIKERS.
		Male.	Female	Total.	Male.	Female	Total.	
1894								
APPANOOSE								
1	Miners and laborers	380	.....	380	380	.....	380	320
MAHASKA								
2	Miners	2,400	.....	2,400	1,800	.....	1,800	1,800
MUSCATINE								
3	Conductors and motermen.....	19	1	20	8	...	8	8
PALO ALTO								
4	Cigar factory employes	7	.....	7	7	.....	7	7
POLK								
5	Building laborers, etc.....	100	.....	100	100	.....	100	100
6	Miners	800	.....	800	520	.....	520	520
7	Miners	60	.....	60	40	.....	40	40
1895.								
APPANOOSE								
1	Miners	125	.....	125	100	.....	100	100
2	Miners	600	.....	600	480	.....	480	480
3	Mine employes	50	.....	50	15	.....	15	50
BLACK HAWK								
4	Tailors.....	4	1	5	3	.....	3	3
5	Tailors	6	2	8	6	.....	6	6

No 1—PART II.

from July, 1894, to 1900, inclusive.

Marginal number.	NO. OF STRIKERS.		NUMBER OF EMPLOYEES THROWN OUT OF EMPLOYMENT BY STRIKES.				NUMBER OF NEW EMPLOYEES AFTER STRIKE.			WEEKLY WORKING HOURS.	
	Female	Total.	Male.	Female	Total.	Male.	Female	Total.	Bro't from other places.	Before strike.	After strike.
COUNTY.											
1	...	320	320	.....	320	.....	.....	.....	.....	60	60
COUNTY.											
2	1,800	2,280	.....	2,280	.....	.....	.....	.....	60	60
COUNTY.											
3	8	8	.....	8	.....	.....	.....	.....	73½	73½
COUNTY.											
4	7	7	.....	7	4	.....	4	4	48	60
COUNTY.											
5	100	100	.....	100	.....	.....	.....	.....	60	60
6	520	660	.....	660	.....	.....	.....	.....	60	60
7	40	50	.....	50	.....	.....	.....	.....	60	60
COUNTY.											
1	100	115	.....	115	.....	.....	.....	.....	60	60
2	40	50	.....	50	.....	.....	.....	.....	60	60
3	50	50	.....	50	.....	.....	.....	.....	60	60
COUNTY.											
4	3	3	.....	3	.....	4	4	.....	60	60
5	6	6	.....	6	.....	3	5	.....	60	60

TABLE No. 1

Marginal number.	OCCUPATION.	LOCALITY.	CAUSE OR OBJECT.
1895.—Continued.			BOONE
6	Tailors.....	Boone.....	Against 6 per cent reduction in wages and for recognition of union.....
			DES MOINES
7	Woodworking machine hands....	Burlington.....	Against reduction of wages.....
			DUBUQUE
8	Machine operators, shirts & overalls	Dubuque.....	Against 15 per cent reduction in wages
9	Machinists, stamping works.....	Dubuque.....	Against 20 per cent reduction in wages
			KEOKUK
10	Mine employes.....	What Cheer..	Against 5 per cent reduction in wages.
11	Mine employes.....	What Cheer..	Against 10 per cent reduction in wages.....
			LEE
12	Coopers.....	Keokuk.....	For increase of wages and recognition of union.....
			LUCAS
13	Mine employes.....	Lucas.....	Against reduction of wages.....
			MAHASKA
14	Cigar Makers.....	Oskaloosa.....	Against a reduction of wages of 50 cents per 1,000.....
15	Cigar Makers.....	Oskaloosa.....	To enforce union rules as to number of apprentices.....
			MARION
16	Mine employes.....	Dunreath.....	Against 10 per cent reduction in wages.....
			MONTGOMERY
17	Cigar Makers.....	Red Oak.....	Against reduction of wages and abolition of union rules.....
			MUSCATINE
18	Cigar Makers.....	Muscatine.....	Against reduction of wages.....
19	Cigar Makers.....	Muscatine.....	Against reduction of wages.....

-PART I-CONTINUED.

Marginal number.	Ordered by labor organization.	Succeeded.	NUMBER OF ESTABLISHMENTS INVOLVED.		Beginning.	STRIKERS RE-EMPLOYED OR PLACES FILLED BY OTHERS.		EMPLOYEES—		Loss of employers.
			Closed	Not closed.		Date.	Days to date.	Wage loss.	Assistance.	
COUNTY.										
6	No....	No....		1	June 15	June 20, 1895...	5	\$ 100		
COUNTY.										
7	Yes....	No....	1		Oct. 1...	Dec. 1, 1895...	61	8,000		\$ 500
COUNTY.										
8	No....	No....		1	Sept. 1...	Sept. 8, 1895...	7	500		200
9	No....	No....			May 1...	May 20, 1895...	19	200		100
COUNTY.										
10	No....	No....	1		Feb. 1...	Feb. 3, 1895...	2	\$ 50		
11	No....	No....	1		Mar. 1...	March 20, 1895...	19	200		\$ 100
COUNTY.										
12	Yes....	No....		1	May 1...	Jan. 1, 1896...	245	5,600	\$ 300	
COUNTY.										
13	No....	No....	1		April 1...	April 15, 1895...	14	400		100
COUNTY.										
14	Yes....	Yes....		1	Feb. 20...	Feb. 23, 1895...	3	10		
15	Yes....	No....		1	April 12...	May 30, 1895...	48	250		1,000
COUNTY.										
16	No....	Yes....	1		Feb. 1...	Feb. 3, 1895...	2	320		50
COUNTY.										
17	Yes....	No....		1	March 21...	April 5, 1895...	15	200	15	150
COUNTY.										
18	Yes....	No....		1	March 21...	July 15, 1895...	116	300		500
19	Yes....	Yes....		2	July 18...	July 23, 1895...	5	120		

TABLE No. 1

Marginal number.	OCCUPATION.	EMPLOYES BEFORE STRIKE.			EMPLOYES FOR WHOM STRIKE WAS UNDERTAKEN.			NO. OF STRIKERS.
		Male.	Female	Total.	Male.	Female	Total.	
1895.—Continued.								
BOONE								
6	Tailors.....	11	.....	11	4	.....	4	4
DES MOINES								
7	Wood working machine hands..	393	6	399	112	.....	112	112
DUBUQUE								
8	Machine operators overalls, etc.	40	20	60	6	.....	6	6
9	Machinists stamping works.....	30	200	230	.....	30	30	.....
KEOKUK								
10	Mine employes.....	20	.....	20	20	.....	20	20
11	Mine employes.....	10	.....	10	10	.....	10	10
LEE								
12	Coopers.....	111	.....	111	30	.....	30	30
LUCAS								
13	Mine employes.....	20	.....	20	20	.....	20	20
MAHASKA								
14	Cigar makers.....	5	.....	5	2	.....	2	2
15	Cigar makers.....	12	.....	12	10	.....	10	10
MARION								
16	Mine employes.....	80	.....	80	80	.....	80	80
MONTGOMERY								
17	Cigar makers.....	8	.....	8	4	.....	4	4

-PART II—CONTINUED.

Marginal number.	NO. OF STRIKERS.		NUMBER OF EMPLOYEES THROWN OUT OF EMPLOYMENT BY STRIKES.				NUMBER OF NEW EMPLOYEES AFTER STRIKE.				WEEKLY WORKING HOURS.	
	Female	Total.	Male.	Female	Total.	Male.	Female	Total.	Bro't from other places.		Before strike.	After strike.
COUNTY.												
6		4	4		4	2		2			60	60
COUNTY												
7		112	393	6	399						60	60
COUNTY.												
8		6	6		6						60	60
9	30	30	10	100	110						60	60
COUNTY												
10		20	20		20						60	60
11		10	10		10						60	60
COUNTY.												
12		30	30		30	15		15	15		60	60
COUNTY												
13		20	20		20						60	60
COUNTY.												
14		2	2		2						48	48
15		10	10		10	5		5	5		48	60
COUNTY.												
16		80	80		80						60	60
COUNTY.												
17		4	4		4	8		8			48	60

TABLE No. 1

Marginal number.	OCCUPATION.	LOCALITY.	CAUSE OR OBJECT.
1895.—Continued.			MONROE
20	Miners.....	Albia.....	Against reduction from 85 to 70 cents per ton for mining
			TAYLOR
21	Mine employes.....	New Market..	For increase of wages
22	Mine employes.....	New Market..	Against 15 per cent reduction in wages.....
			WAPELLO
23	Tailors	Ottumwa.....	Against 40 per cent reduction in wages.....
24	Coal loaders.....	Eldon.....	Against 10 per cent reduction in wages.....
25	Coal loaders.....	Eldon.....	For 10 per cent increase in wages....
26	Mine employes.....	Ottumwa	For 20 per cent increase in wages....
			WAYNE
27	Mine employes.....	Confidence...	For 12 per cent increase in wages
			APPANOOSE AND OTHER
28	Mine employes.....	a	For increase of wages
29	Mine employes.....	b	For increase from 80 cents to \$1.00 per ton for mining
			(a) Appanoose, Boone, Polk, Webster, Jasper, Wayne, Wapello and Lucas counties.
			(b) Appanoose, Boone, Webster and Polk counties.
1896.			APPANOOSE
1	Mine employes.....	Diamond	Against 10 per cent reduction in wages
2	Mine employes.....	Brazil	For increase in wages
			DES MOINES
3	Peelers and sorters pickle works ..	Burlington ..	Against reduction from 5 to 4c per gallon for peeling and sorting onions
			JASPER
4	Miners.....	Colfax	Against reduction in wages
5	Mine employes.....	Colfax	Against reduction in wages

-PART I—CONTINUED.

Marginal number.	Ordered by labor organization.	Succeeded.	NUMBER OF ESTABLISHMENTS INVOLVED.		Beginning.	STRIKERS RE-EMPLOYED OR PLACES FILLED BY OTHERS.		EMPLOYEES—		Loss of employers.
			Closed.	Not closed.		Date.	Days to date.	Wage loss.	Assistance.	

COUNTY.

20	No.....	No.....	2	July 1...	July 31, 1895...	30	\$ 1,500
----	---------	---------	---	-------	-----------	------------------	----	----------	-------	-------

COUNTY.

21	No.....	No.....	1	.....	Feb. 1...	Feb. 10, 1895..	9	450	.....	\$ 100
22	No.....	No.....	1	.....	March 15	March 19, 1895	4	90	.....	.....

COUNTY.

23	Yes....	No.....	1	.....	Feb. 1...	March 1, 1895..	28	400	\$ 108	200
24	No.....	No.....	1	.....	March 10	May 10, 1895..	61	3,000	.....	1,000
25	No.....	Yes....	1	.....	Sept. 1...	Oct. 2, 1895...	31	1,750	.....	500
26	No.....	Yes....	1	.....	Nov. 1...	Nov. 4, 1895...	3	30	.....	.....

COUNTY.

27	No.....	Yes....	1	Dec. 1...	Dec. 2, 1895..	1	8
----	---------	---------	---	-------	-----------	----------------	---	---	-------	-------

COUNTIES GENERAL STRIKE.

28	Yes....	No.....	155	.....	March 29	June 10, 1895.	45	390,000	12,000	75,000
29	Yes....	.....	80	.....	Oct. 1...	Nov. 10, 1895..	30	200,000	15,000	70,000

29) Succeeded in 20 mines; partly succeeded in 60 mines.

COUNTY.

1	Yes....	No.....	1	.....	March 1.	March 8, 1895.	7	\$ 500	.....	.....
2	Yes....	Yes....	1	.....	Sept. 1...	Sept. 8, 1895..	7	200	.....	.....

COUNTY.

3	No.....	No.....	1	Jan. 20..	Jan. 25, 1896..	5	\$ 60
---	---------	---------	---	-------	-----------	-----------------	---	-------	-------	-------

COUNTY.

4	Yes....	Yes....	1	.....	Feb. 19.	Feb. 24, 1896..	5	\$ 6,000	.....	\$ 1,000
5	Yes....	No.....	1	.....	April 1...	June 15, 1896..	75	90,000	\$ 1,000	7,000

TABLE No. 1

Marginal number.	OCCUPATION.	EMPLOYES BEFORE STRIKE.			EMPLOYES FOR WHOM STRIKE WAS UNDERTAKEN.			NO. OF STRIKERS.
		Male.	Female	Total.	Male.	Female	Total.	
		Male.	Female	Total.	Male.	Female	Total.	
1895.—Continued.								
MUSCATINE								
18	Cigar makers	4	5	9	4	.....	4	4
19	Cigar makers	15	.....	15	12	.....	12	12
MONROE								
20	Miners	50	.....	50	40	.....	40	40
TAYLOR								
21	Mine employes	30	.....	30	30	.....	30	30
22	Mine employes	21	.....	21	21	.....	21	21
WAPELLO								
23	Tailors	15	3	18	11	.....	11	11
24	Coal loaders	40	.....	40	20	.....	20	20
25	Coal loaders	45	.....	45	20	.....	20	20
26	Mine employes	6	.....	6	6	.....	6	6
WAYNE								
27	Mine employes	5	.....	5	5	.....	5	5
APPANOOSE AND OTHER								
28	Mine employes	7,500	.....	7,500	6,000	.....	6,000	6,000
29	Mine employes	5,000	.....	5,600	4,000	.....	4,000	4,000
1896								
APPANOOSE								
1	Mine employes	50	.....	50	50	.....	50	50
2	Mine employes	20	.....	20	20	.....	20	20
DES MOINES								
3	Peelers and sorters pickle works	5	28	33	.....	25	25	.....

-PART II—CONTINUED.

Marginal number.	NO. OF STRIKERS.		NUMBER OF EMPLOYEES THROWN OUT OF EMPLOYMENT BY STRIKES.			NUMBER OF NEW EMPLOYEES AFTER STRIKE.				WEEKLY WORKING HOURS.	
	Female	Total.	Male.	Female	Total.	Male.	Female	Total.	Bro't from other places.	Before strike.	After strike.

COUNTY.

18	.....	4	4	.....	4	4	.....	4	4	48	48
19	.....	12	12	.....	12	.....	.....	.....	.....	48	48

COUNTY

20	40	45	45	60	60
----	-------	----	----	-------	----	-------	-------	-------	-------	----	----

COUNTY.

21	.....	30	30	.....	30	.....	.....	.....	.....	60	60
22	.....	21	21	.....	21	.....	.....	.....	.....	60	60

COUNTY.

23	.....	11	11	.....	11	.....	.....	.....	.....	60	60
24	.....	20	40	.....	40	.....	.....	.....	.....	60	60
25	.....	20	40	.....	40	.....	.....	.....	.....	60	60
26	.....	6	6	.....	6	.....	.....	.....	.....	60	60

COUNTY.

27	5	5	5	60	60
----	-------	---	---	-------	---	-------	-------	-------	-------	----	----

COUNTIES—(GENERAL STRIKE).

28	.....	6,000	6,500	.....	6,500	500	.....	500	500	60	60
29	.....	4,000	4,800	.....	4,800	.....	.....	.....	.....	60	60

COUNTY.

1	.....	50	50	.....	50	.....	.....	.....	.....	60	60
2	.....	20	20	.....	20	.....	.....	.....	.....	60	60

COUNTY.

3	25	25	25	25	5	5	60	60
---	----	----	-------	----	----	-------	---	---	-------	----	----

TABLE No. 1

Marginal number.	OCCUPATION.	LOCALITY.	CAUSE OR OBJECT.
1896.—Continued.			KEOKUK
6	Mine employes.....	Thornburg ...	Against 20 per cent reduction of wages
7	Mine employes....	What Cheer ...	For increase of wages and reduction in price of powder
			LUCAS
8	Mine employes...	Lucas.....	Against 15 per cent reduction of wages
			MARION
9	Miners	Swan	Against reduction from 80 cents to 70 cents per ton for mining.....
			MONROE
10	Miners....	Foster	For increase of wages from 80 cents to \$1.00 per ton
			POLK
11	Miners.....	Des Moines...	Against reduction of wages from 80 to 50 cents per ton for mining.....
12	Mine employes.....	Des Moines ..	Against change to summer scale earlier than usual.....
13	Mine employes.....	Des Moines...	For increase of wages
14	Miners....	Des Moines...	For 10c per ton increase for mining..
15	Mine employes.....	Des Moines...	For fortnightly payment
16	Cigar makers.....	Des Moines...	To enforce union rules as to number of apprentices
			POTTAWATTAMIE
17	Compositors and pressmen	Council Bluffs	For discharge of obnoxious foreman ..
			SCOTT
18	Compositors	Davenport	For adoption of union scale.....
			WAPELLO
19	Teamsters	Ottumwa	For increase of wages.....
			WEBSTER
20	Miners.....	Coalville	Against reduction from 70 to 55 cents per ton for mining

-PART I-CONTINUED.

Marginal number.	Ordered by labor organization.	Succeeded.	NUMBER OF ESTABLISHMENTS INVOLVED.		Beginning.	STRIKERS RE-EMPLOYED OR PLACES FILLED BY OTHERS.		EMPLOYEES'—		Loss of employers.
			Closed	Not closed.		Date.	Days to date.	Wage loss.	Assistance.	
COUNTY.										
6	No	No	1		April 15.	June 4, 1896	50	\$ 3,750		\$ 1,000
7	Yes	No	5		Aug. 15.	Nov. 1, 1896	78	40,625		18,000
COUNTY.										
8	No	No	1		May 1.	May 11, 1896	10	\$ 350		
COUNTY.										
9	No	No	1		March 15	March 23, 1896	8	\$ 500		\$ 100
COUNTY.										
10	No	No	1		Jan. 7.	Jan. 20, 1896	13	\$ 2,000		\$ 1,500
COUNTY.										
11	Yes	Yes	1		Jan. 18.	Jan. 25, 1896	7	\$ 600.		\$ 200
12	Yes	(a)	8		Feb. 20	April 2, 1896	44	34,834		14,000
13	Yes	No	1		April 1.	April 15, 1896	14	6,000		2,000
14	Yes	Yes	1		Aug. 24.	Oct. 15, 1896	52	21,000		7,000
15	Yes	Yes	20		Oct. 20.	Oct. 30, 1896	10	16,000		10,000
16	Yes	Yes	1		Sept. 4.	Sept. 18, 1896	14	140	\$ 52	100
COUNTY.										
17	Yes	Yes	1		Jan. 5.	Jan. 6, 1896	1	\$ 25		
COUNTY.										
18	Yes	(b)	4		Feb. 3.	Feb. 8, 1896	3	\$ 1,700	\$ 1,172	\$ 1,000
COUNTY.										
19	Yes	Yes	1		Dec. 20.	Dec. 21, 1896	1	\$ 50		
COUNTY.										
20	No	No	1		Oct. 1.	Oct. 15, 1896	14	\$ 1,500		\$ 500

a. Succeeded in one mine, failed in seven mines.

b. Succeeded in one establishment, failed in three.

TABLE No. 1

Marginal number.	OCCUPATION.	EMPLOYES BEFORE STRIKE.			EMPLOYES FOR WHOM STRIKE WAS UNDERTAKEN.			NO. OF STRIKERS.
		Male.	Female	Total.	Male.	Female	Total.	
1896—Continued.								
JASPER								
4	Miners	800	.....	800	720	.....	720	720
5	Mine employes.....	800	.....	800	800	.....	800	800
KEOKUK								
6	Mine employes.....	50	.....	50	50	.....	50	50
7	Mine employes.....	285	.....	285	285	.....	285	285
LUCAS								
8	Mine employes.....	35	.....	35	35	.....	35	35
MARION								
9	Miners	45	.....	45	30	.....	30	30
MONROE								
10	Miners	100	.....	100	80	.....	80	80
POLK								
11	Miners	60	.....	60	60	.....	60	60
12	Mine employes.....	655	.....	655	600	.....	600	655
13	Mine employes.....	300	.....	300	300	.....	300	300
14	Miners.....	300	.....	300	260	.....	260	260
15	Mine employes.....	800	.....	800	800	.....	800	800
16	Cigar makers	9	.....	9	7	.....	7	7
POTTAWATTAMIE								
17	Compositors and pressmen.....	48	2	50	12	.....	12	12
SCOTT								
18	Compositors	80	6	86	18	3	21	18
WAPELL								
19	Teamsters	22	.....	22	22	.....	22	22

-PART II--CONTINUED.

Marginal number.	NO. OF STRIKERS		NUMBER OF EMPLOYEES THROWN OUT OF EMPLOYMENT BY STRIKES.			NUMBER OF NEW EMPLOYEES AFTER STRIKE.				WEEKLY WORKING HOURS.	
	Female	Total.	Male.	Female	Total.	Male.	Female	Total.	Bro't from other places.	Before strike.	After strike

COUNTY.

4	.....	720	800	.....	800	.....	.....	.....	.....	60	60
5	.....	800	800	.....	800	200	.....	200	200	60	60

COUNTY.

6	.....	50	50	.....	50	.....	.....	.....	.....	60	60
7	.....	285	285	.....	285	85	.....	85	85	60	60

COUNTY.

8	35	35	35	60	60
---	-------	----	----	-------	----	-------	-------	-------	-------	----	----

COUNTY.

9	30	39	39	60	60
---	-------	----	----	-------	----	-------	-------	-------	-------	----	----

COUNTY.

10	80	90	90	60	60
----	-------	----	----	-------	----	-------	-------	-------	-------	----	----

COUNTY.

11	.....	60	60	.....	60	.....	.....	.....	.....	60	60
12	.....	655	655	.....	655	.....	.....	.....	.....	60	60
13	.....	300	300	.....	300	.....	.....	.....	.....	60	60
14	.....	260	285	.....	285	.....	.....	.....	.....	60	60
15	.....	90	800	.....	800	.....	.....	.....	.....	60	60
16	.....	7	7	.....	7	.....	.....	.....	.....	48	48

COUNTY.

17	12	12	12	1	1	60	60
----	-------	----	----	-------	----	---	-------	---	-------	----	----

COUNTY.

18	3	21	18	3	21	12	1	13	13	54	54
----	---	----	----	---	----	----	---	----	----	----	----

COUNTY.

19	22	22	22	60	60
----	-------	----	----	-------	----	-------	-------	-------	-------	----	----

TABLE No. 1—

Marginal number.	OCCUPATION.	LOCALITY.	CAUSE OR OBJECT.
1897.			APPANOOSE
1	Mine employes.....	Centerville ...	Against change from fortnightly to monthly payments.....
2	Miners.....	Mystic	For increase from 50 to 70 cents a ton for mining.....
3	Miners.....	Lost Creek...	Against 15 per cent reduction in wages
4	Miners.....	14 mines in county.....	For restoration of union scale and annual contract.....
5	Mine employes.....	Mystic	For increase of wages.....
			DES MOINES
6	Telephone line men and laborers..	Burlington ..	For payment of wages overdue.....
			DUBUQUE
7	Machine operators, overall factory,	Dubuque,	Against 10 per cent reduction in wages
			LINN
8	Chocolate dippers, candy factory..	Cedar Rapids.	For 8 per cent increase of wages and change from piece to day work.....
			MARION
9	Miners.....	Flagler	Against reduction of wages.....
			MONROE
10	Mine employes.....	Avery,	Against reduction of wages.....
11	Miners.....	Cedar Mines	Against reduction of wages.....
12	Miners.....	Keb and Chisholm.....	Against reduction from 70 to 65 cents per ton for mining.....
13	Miners and laborers.....	Chisholm	For increase from 65 to 90 cents per ton for mining and for \$1.45 instead of \$1.25 for laborers.....
			MUSCATINE
14	Cigarmakers.....	Muscatine	To enforce union rules as to number of apprentices allowed.....

-PART I—CONTINUED.

Marginal number.	Ordered by labor organization.	Succeeded.	NUMBER OF ESTABLISHMENTS INVOLVED.		Beginning.	STRIKERS RE-EMPLOYED OR PLACES FILLED BY OTHERS.		EMPLOYEES'—		Loss of employees.
			Closed.	Not closed.		Date.	Days to date.	Wage oss.	Assistance.	
COUNTY.										
1	Yes....	No....	1	.....	Feb. 1 ..	Feb. 16, 1897..	15	\$ 200	.....	\$ 100
2	Yes....	Yes....	16	.....	June 7..	Aug. 7, 1897..	61	13,000	.....	.....
3	Yes....	No....	1	.....	July 1..	July 7, 1897..	6	2,500	.....	500
4	Yes....	Partly	14	.....	Aug. 1..	Aug. 15, 1897..	14	4,000	.....	2,000
5	Yes....	Yes....	20	.....	Oct. 1..	Oct. 11, 1897..	10	6,000	.....	4,000
COUNTY.										
6	No....	Yes....	1	.....	Aug. 10..	Sept. 1, 1897..	22	1,000	.....	.....
COUNTY.										
7	No....	Yes....	1	.....	June 30..	July 7, 1897..	7	1,200	.....	200
COUNTY.										
8	No....	Yes....	1	.....	Nov. 20..	Nov. 28, 1897..	8	50	.....	25
COUNTY.										
9	Yes....	No....	1	.....	Apr. 1..	Sept. 1, 1897..	153	5,000	.....	1,500
COUNTY.										
10	Yes....	Yes....	5	.....	Apr. 1..	Apr. 10, 1897..	9	5,000	.....	1,000
11	Yes....	Yes....	1	.....	Apr. 1..	May 1, 1897..	30	5,000	.....	1,000
12	Yes....	No....	3	.....	Apr. 1..	July 30, 1897..	120	120,000	1,500	30,000
13	Yes....	Yes....	1	.....	Oct. 1..	Oct. 16, 1897..	15	2,000	.....	1,000
COUNTY.										
14	Yes....	No....	1	.....	Feb. 15..	July 3, 1897..	138	\$ 120	\$ 65	\$ 200

TABLE No 1

Marginal number.	OCCUPATION.	EMPLOYES BEFORE STRIKE.			EMPLOYES FOR WHOM STRIKE WAS UNDERTAKEN.			NO. OF STRIKERS.
		Male.	Female	Total.	Male.	Female	Total.	Male.
1896—Continued.								
WEBSTER								
20	Miners.....	90	.....	90	70	....	70	70
1897.								
APPANOOSE								
1	Mine employes.....	10	.....	10	10	.....	10	10
2	Miners.....	220	.....	220	160	.....	160	160
3	Miners.....	250	.....	250	200	.....	200	200
4	Miners.....	500	.....	500	420	.....	420	420
5	Mine employes.....	400	.....	400	400	.....	400	400
DES MOINES								
6	Telephone linemen, etc....	100	..	100	36	..	36	36
DUBUQUE								
7	Machine operators, overalls factory.....	100	300	400	.....	200	200	.....
LINN								
8	Chocolate dippers, etc....	15	45	60	..	30	30	.....
MARION								
9	Miners.....	40	.....	40	30	..	30	30
MONROE								
10	Mine employes.....	400	.....	400	400	.....	400	400
11	Miners.....	100	.....	100	85	.....	85	85
12	Miners.....	600	.....	600	525	.....	525	525
13	Miners and laborers.....	100	.....	100	95	.....	95	95
MUSCATINE								
14	Cigar makers.....	4	.....	4	2	..	2	2

1902]

BUREAU OF LABOR STATISTICS.

-PART II—CONTINUED.

Marginal number.	NO. OF STRIKERS.		NUMBER OF EMPLOYEES THROWN OUT OF EMPLOYMENT BY STRIKES.			NUMBER OF NEW EMPLOYEES AFTER STRIKE.				WEEKLY WORKING HOURS.	
	Female	Total.	Male.	Female	Total.	Male.	Female	Total.	Bro't from other places.	Before strike.	After strike.
COUNTY.											
20	70	84	.....	84	.....	.....	.....	.....	60	60
COUNTY.											
1	10	10	.....	10	.....	.....	.....	.....	60	60
2	160	180	.....	180	.....	.....	.....	.....	60	60
3	200	235	.....	235	.....	.....	.....	.....	60	60
4	420	500	.....	500	.....	.....	.....	.....	60	60
5	400	400	.....	400	.....	.....	.....	.....	60	60
COUNTY.											
6	36	36	.....	36	.....	.....	.....	.....	60	60
COUNTY.											
7	200	200	.....	200	200	.....	.....	.....	.....	60	60
COUNTY.											
8	30	30	.....	30	30	.....	10	10	.....	60	60
COUNTY.											
9	30	40	.....	40	.....	.....	.....	.....	60	60
COUNTY.											
10	400	400	.....	400	.....	.....	.....	.....	60	60
11	85	100	.....	100	.....	.....	.....	.....	60	60
12	525	575	.....	575	200	.....	200	200	60	60
13	95	95	.....	95	.....	.....	.....	.....	60	60
COUNTY.											
14	2	2	.....	2	2	.....	2	2	48	60

TABLE No. 1

Marginal number.	OCCUPATION.	LOCALITY.	CAUSE OR OBJECT.
1897—Continued.			POLK
15	Mine employes.....	Des Moines...	Against reduction of wages.....
16	Mine employes.....	Des Moines...	For increase of wages.....
17	Miners.....	Des Moines...	Against reduction from 80 to 50 cents per ton for mining.....
18	Miners.....	Polk county, 29 mines....	For increase from 80 and 90 cents to \$1.00 per ton for mining.....
			SCOTT
19	Compositors and pressmen	Davenport....	For restoration of wages.....
20	Winders, in broom factory.....	Davenport....	For increase of wages from 25 to 26 and 27 cents per dozen.
			TAYLOR
21	Mine employes.....	New Market..	Against reduction of wages.....
			WAPELLO
22	Miners.....	Ottumwa.....	Against change to summer scale one month too early.....
23	Mine employes.....	Eldon	For increase of 15 per cent in wages ..
			WEBSTER
24	Mine employes.	Webster Co....	Against reduction of wages of 20 cents per load
25	Mine employes.....	Lehigh.....	For increase of wages.....
1898.			APPANOOSE
1	Miners.....	14 mines in county.....	For increase from 70 and 80 cents to 90 cents per ton for mining.....
2	Miners.....	Jerome.	Against excessive charges for black-smithing.....
			BLACKHAWK
3	Molders, gasoline engine factory..	Waterloo	Against change from day to piece work.....
			DUBUQUE
4	Machine operators overall and shirt factory.....	Dubuque.	For adoption of new scale.....
5	Riveters, shipyards	Dubuque .	For 15 per cent increase of wages

-PART I-CONTINUED.

Marginal number.	Ordered by labor organization.	Succeeded.	NUMBER OF ESTABLISHMENTS INVOLVED.		Beginning.	STRIKERS RE-EMPLOYED OR PLACES FILLED BY OTHERS.		EMPLOYERS'—		Loss of employers.
			Closed.	Not closed.		Date.	Days to date.	Wage loss.	Assistance.	

COUNTY.

15	Yes....	Yes....	4	.....	Jan. 19..	Feb. 11, 1897..	23	\$ 1,200	.....	\$ 1,000
16	Yes....	No....	5	.....	Apr. 8..	April 20, 1897.	12	7,500	.....	3,000
17	Yes....	Yes....	1	.....	Feb. 1.	Feb. 11, 1897.	10	600	.....	1,000
18	Yes....	No....	20	.....	Aug. 25.	Sept. 30, 1897.	15	30,000	\$ 2,000	18,000

COUNTY.

19	Yes	No....	1	.....	March 24	March 31, 1897	7	625	342	1,000
20	No	No	1	.....	June 4.	June 11, 1897..	7	75	.....	.....

COUNTY.

21	Yes....	No....	1	May 1...	May 13, 1897..	12	500
----	---------	--------	---	-------	----------	----------------	----	-----	-------	-------

COUNTY.

22	Yes....	No....	3	.....	Mar. 1..	April 1, 1897..	31	2,500	.....	800
23	Yes....	Yes....	1	.....	Sept. 1..	Oct. 16, 1897..	45	2,500	.....	500

COUNTY.

24	Yes....	Yes....	2	.....	Jan. 28..	Feb. 3, 1897..	6	100	.....	40
25	Yes....	No....	3	.....	Sept. 1..	Sept. 8, 1897..	7	8,000	.....	40,000

COUNTY.

1	Yes....	Yes....	14	.....	Sept. 1..	Oct. 16, 1898..	35	\$27,500	\$ 5,000	\$ 15,000
2	Yes....	Yes....	1	.....	Dec. 20.	Dec. 30, 1898	10	1,350	.....	500

COUNTY.

3	No....	No....	1	Oct. 1.	Oct. 8, 1898..	7	400	200
---	--------	--------	---	-------	---------	----------------	---	-----	-------	-----

COUNTY.

4	No....	Yes....	1	.....	April 1..	April 20, 1898	19	800	.....	4,000
5	No....	No....	1	.....	June 6..	June 9, 1898..	3	300	.....	100

TABLE No. 1

Marginal number.	OCCUPATION.	EMPLOYEES BEFORE STRIKE.			EMPLOYEES FOR WHOM STRIKE WAS UNDERTAKEN.			NO. OF STRIKERS.	
		Male.	Female	Total.	Male.	Female	Total.	Male.	
1900—CONCLUDED.									WOODBURY
48	Carpenters	30	.....	30	19	.....	19	11
49	Brick layers	38	.....	38	4	.....	4	4
50	Plumbers and steam fitters	18	1	19	8	.....	8	8
51	Barbers	5	.....	5	2	.....	2	2

—PART II—CONCLUDED.

Marginal number.	NO. OF STRIKERS.		NUMBER OF EMPLOYEES THROWN OUT OF EMPLOYMENT BY STRIKES.			NUMBER OF NEW EMPLOYEES AFTER STRIKE.				WEEKLY WORKING HOURS.	
	Female	Total.	Male.	Female	Total.	Male.	Female	Total.	Bro't from other places.	Before strike.	After strike.

COUNTY.

48	.....	11	11	.....	11	6	.....	6	.....	(a)	60
49	.....	4	4	.....	4	4	.....	4	.....	54	60
50	.....	8	9	.....	9	.....	.....	.....	.....	48	48
51	.....	2	2	.....	2	2	.....	2	.....	83	83

(a) Fifty-four and sixty hours.

TABLE

Summary of strikes for the state of Iowa in all counties

Marginal number.	COUNTY.	Total number of strikes.	Total number of strikers	Number for whom strike was undertaken.	ORDERED BY LABOR ORGANIZATION.	
					Yes.	No.
1894—SIX MONTHS						
1	Appanoose.....	15	320	380	15	.....
2	Mahaska.....	12	1,800	1,800	12	.....
3	Muscatine.....	1	8	8	.....	1
4	Palo Alto.....	1	7	7	1	.....
5	Polk.....	16	660	660	15	1
Total for six months 1894.....		45	2,795	2,855	43	2
1895.						
1	Appanoose.....	4	630	595	2	2
2	Black Hawk.....	2	9	9	2	.....
3	Boone.....	1	4	4	.....	1
4	Des Moines.....	1	112	112	1	.....
5	Dubuque.....	2	36	36	.....	2
6	Keokuk.....	2	30	30	.....	2
7	Lee.....	1	30	30	1	.....
8	Lucas.....	1	20	20	.....	1
9	Mahaska.....	2	12	12	2	.....
10	Marion.....	1	80	80	.....	1
11	Montgomery.....	1	4	4	1	.....
12	Muscatine.....	2	16	16	2	.....
13	Monroe.....	1	40	40	.....	1
14	Taylor.....	2	51	51	.....	2
15	Wapello.....	4	57	57	1	3
16	Wayne.....	1	5	5	.....	1
17	Twelve counties (a).....	2	10,000	10,000	2	.....
Total for 1895.....		30	11,136	11,101	14	16

(a) Appanoose, Boone, Polk, Webster, Jasper, Wayne, Wapello, Lucas, first general ing eighty mines.

1896.						
1	Appanoose.....	2	70	70	2	.....
2	Des Moines.....	1	25	25	.....	1
3	Jasper.....	2	1,520	1,520	2	.....
4	Keokuk.....	6	335	335	5	1
5	Lucas.....	1	35	35	.....	1
6	Marion.....	1	30	30	.....	1
7	Monroe.....	1	80	80	.....	1
8	Polk.....	32	2,027	2,082	32	.....
9	Pottawattamie.....	1	12	12	1	.....
10	Scott.....	4	21	21	4	.....
11	Wapello.....	1	22	22	1	.....
12	Webster.....	1	70	70	.....	1
Total for 1896.....		53	4,247	4,302	47	6

No. 2.

where strikes took place and including all industries.

Marginal number.	NUMBER OF STRIKES WHICH—			NUMBER OF ESTABLISHMENTS—			TOTAL COST.		
	Suc- ceeded	Partly Suc- ceeded.	Failed.	In- volved.	Closed.	Total number days closed.	Wage loss.	Assist- ance.	Loss of employ- ers.
1	15			15	15	10	\$ 4,000		\$ 1,000
2			12	12	12	20	54,000	\$ 5,000	20,000
3			1	1	1	6	56		150
4			1	1	1	30	600	105	2,500
5	10			10	10	20	8,900		5,500
	31		14	45	45	86	\$ 67,456	\$ 5,105	\$ 29,150
1	1		3	4	4	58	\$ 7,375		\$ 2,500
2			2	2		41	275		300
3			1	1		5	100		
4			1	1	1	61	8,000		500
5			2	2		26	700		300
6			2	2	2	21	250		100
7			1	1		245	5,600	\$ 300	
8			1	1	1	14	400		100
9	1		1	2		51	260		1,000
10	1		1	1	1	2	320		50
11			1	1		15	200	15	150
12	2		1	3		121	430		500
13			1	2	2	30	1,500		
14			2	2	2	13	540		100
15	2		2	4	3	123	5,180	108	1,700
16	1			1	1	1	8		
17	20	60	155	235	235	75	590,000	27,000	145,000
	28	60	176	265	252	902	\$ 621,138	\$ 27,423	\$ 152,300

strike including 155 mines. Appanoose, Boone, Webster. Polk, second general strike includ-

1	1		1	2	2	14	\$ 700		
2			1	1		5	60		
3	1		1	2	2	80	96,000	\$ 1,000	\$ 8,000
4			6	6	6	128	44,375		19,000
5			1	1	1	10	350		
6			1	1	1	8	500		100
7			1	1	1	13	2,000		1,500
8	24		8	32	31	141	78,574	52	33,300
9	1			1		1	25		
10	1		3	4		3	1,700	1,172	1,000
11	1			1	1	1	50		
12			1	1	1	14	1,500		500
	20		24	53	46	418	\$ 225,834	\$ 2,224	\$ 61,400

TABLE No. 2—

Marginal number.	COUNTY.	Total number of strikes.	Total number of strikers.	Number for whom strike was undertaken.	ORDERED BY LABOR ORGANIZATION.	
					Yes.	No.
1897.						
1	Appanoose.....	52	1,190	1,190	52	.....
2	Des Moines.....	1	36	36	.....	1
3	Dubuque.....	1	200	200	.....	1
4	Linn.....	1	30	30	.....	1
5	Marion.....	1	30	30	1	.....
6	Monroe.....	10	1,105	1,105	10	.....
7	Muscatine.....	1	2	2	1	.....
8	Polk.....	39	1,861	1,861	39	.....
9	Scott.....	2	10	10	1	1
10	Taylor.....	1	30	30	1	.....
11	Wapello.....	4	130	130	4	.....
12	Webster.....	5	420	405	5	.....
Total for 1897.....		118	5,044	5,029	114	4
1898.						
1	Appanoose.....	15	480	480	15	.....
2	Blackhawk.....	1	25	25	.....	1
3	Dubuque.....	2	68	68	.....	2
4	Linn.....	3	157	157	.....	3
5	Monroe.....	7	100	100	7	.....
6	Polk.....	2	306	306	1	1
7	Pottawattamie.....	1	17	17	1	.....
8	Wapello.....	3	58	58	3	.....
9	Webster.....	1	40	40	1	.....
Total for 1898.....		35	1,251	1,251	28	7
1899						
1	Appanoose.....	2	342	342	1	1
2	Boone.....	4	343	139	.....	4
3	Cedar.....	1	13	13	.....	1
4	(a).....	1	1,040	1,040	.....	1
5	Des Moines.....	1	200	200	1	.....
6	Dubuque.....	3	68	68	1	2
7	Fayette.....	1	45	3	.....	1
8	Linn.....	2	60	65	.....	2
9	Mahaska.....	1	256	64	.....	1
10	Marshall.....	1	200	200	.....	1
11	Monroe.....	1	41	41	.....	1
12	Montgomery.....	1	8	8	1	.....
13	Muscatine.....	4	138	98	3	1
14	Polk.....	6	192	177	5	1
15	Pottawattamie.....	2	10	12	2	.....
16	Scott.....	1	18	18	1	.....
17	Wapello.....	7	481	401	4	3
18	Webster.....	5	552	546	3	2
19	Woodbury.....	5	103	89	4	1
Total for 1899.....		49	4,110	3,524	26	23

CONTINUED.

Marginal number.	NUMBER OF STRIKES WHICH—			NUMBER OF ESTABLISHMENTS—			TOTAL COST.		
	Suc- ceeded.	Partly. Suc- ceeded.	Failed.	In- volved.	Closed.	Total number days closed.	Wage loss.	Assist- ance.	Loss of employ- ers.
1	36	14	2	52	52	106	\$ 25,700	.....	\$ 6,600
2	1	.....	.....	1	.....	22	1,000	.....	.....
3	1	.....	.....	1	.....	7	1,200	.....	200
4	1	.....	.....	1	.....	8	50	.....	25
5	.....	.....	1	1	.....	153	5,000	.....	1,500
6	7	.....	3	10	10	174	132,000	\$ 1,500	33,000
7	.....	.....	1	1	.....	138	170	65	200
8	5	.....	34	39	39	60	39,300	2,000	23,000
9	.....	.....	2	2	.....	14	700	342	1,000
10	.....	.....	1	1	.....	12	500	.....	.....
11	1	.....	3	4	4	76	5,000	.....	1,300
12	2	.....	3	5	5	13	8,100	.....	40,040
	54	14	50	118	112	783	\$218,670	\$ 3,907	\$106,865
1	15	.....	.....	15	15	45	\$ 28,850	\$ 5,000	\$ 15,500
2	1	.....	1	1	.....	7	400	.....	200
3	1	.....	1	2	.....	22	1,100	.....	4,100
4	2	.....	1	3	.....	10	295	.....	25
5	.....	(a)	(a)	(a)	7	(a)	3,500	.....	(a)
6	.....	.....	2	2	1	16	6,025	.....	2,000
7	1	.....	.....	1	.....	1	35	.....	.....
8	1	.....	2	3	1	160	2,800	236	1,150
9	.....	1	.....	1	1	21	1,000	.....	1,500
	20	1	7	35	18	282	\$ 44,005	\$ 5,236	\$ 24,475

(a) Mines closed permanently as unprofitable.

1	1	.....	1	20	21	10	\$ 8,792	\$ 775	\$ 1,260
2	1	.....	3	5	.....	106	23,767	.....	8,000
3	.....	.....	1	1	.....	3	200	.....	.....
4	1	.....	.....	25	24	88	54,640	915	46,650
5	1	.....	.....	1	1	21	4,500	.....	500
6	2	.....	1	5	.....	32	1,100	.....	250
7	1	.....	.....	1	.....	3	235	.....	.....
8	1	.....	1	2	.....	12	965	.....	400
9	1	.....	.....	1	1	10	5,112	.....	1,000
10	1	.....	.....	1	1	1	350	.....	50
11	.....	.....	1	2	2	2	1,800	.....	500
12	.....	.....	1	1	.....	24	250	100	500
13	.....	.....	4	4	1	31	2,800	.....	225
14	4	1	1	14	12	40	1,807	100	1,850
15	1	.....	1	4	.....	30	1,081	45	1,000
16	.....	.....	1	1	.....	30	1,600	450	5,000
17	3	1	3	18	14	66	7,815	1,120	8,550
18	4	1	.....	16	16	179	31,600	100	22,625
19	4	.....	1	12	.....	138	2,684	196	10,200
	26	3	20	143	93	826	\$151,338	\$ 3,801	\$104,562

(a) Several counties in central Iowa.

TABLE No. 2—

Marginal number.	COUNTY.	Total number of strikes.	Total number of strikers.	Number for whom strike was under- taken.	ORDERED BY LABOR ORGANIZATION.	
					Yes.	No.
	1900.					
1	Allamakee.....	1	26	8	1	.....
2	Appanoose.....	6	1,872	1,909	3	3
3	Boone.....	2	65	57	1	1
4	Chickasaw.....	1	2	2	.....	1
5	Clayton.....	1	28	12	.....	1
6	Clinton.....	1	6	6	.....	1
7	Crawford.....	1	13	13	.....	1
8	Des Moines.....	1	34	34	1	.....
9	Dubuque.....	2	31	31	1	1
10	Emmet.....	1	14	14	.....	1
11	Linn.....	4	80	77	2	2
12	Mahaska.....	2	227	651	2	.....
13	Marion.....	1	35	35	1	.....
14	Muscatine.....	5	159	196	1	4
15	Polk.....	11	1,328	1,042	7	4
16	Poweshiek.....	1	7	7	.....	1
17	Scott.....	2	172	386	2	.....
18	Wapello.....	2	24	13	.....	2
19	Webster.....	2	205	250	.....	2
20	Woodbury.....	4	25	33	2	2
	Total for 1900.....	51	4,353	4,776	24	27

CONTINUED.

Marginal number.	NUMBER OF STRIKES WHICH—			NUMBER OF ESTABLISHMENTS—			TOTAL COST.		
	Suc- ceeded.	Partly. Suc- ceeded.	Failed.	In- volved.	Closed.	Total number days clo sed.	Wage loss.	Assist- ance.	Loss of employ- ers.
1	.....	.....	1	2	2	2	126	.....	35
2	4	.....	2	64	63	110	72,960	.....	27,580
3	1	1	.....	2	2	17	904	.....	230
4	.....	.....	1	1	1	6	114	.....	.....
5	.....	.....	1	1	.....	13	300	.....	200
6	1	.....	.....	1	.....	2	24	.....	(a) 5,000
7	1	.....	.....	1	1	1	20	.....	.....
8	1	.....	.....	3	.....	10	460	330	.....
9	1	1	.....	4	3	19	600	.....	600
10	.....	.....	1	1	.....	2	.....	.....	25
11	.....	.....	4	7	3	59	4,093	525	4,000
12	1	.....	1	4	.....	21	5,454	.....	2,000
13	1	.....	.....	1	1	105	2,200	75	3,000
14	4	.....	1	5	3	86	2,410	.....	2,650
15	5	1	5	28	6	133	12,149	913	4,865
16	.....	.....	1	1	.....	23	548	.....	250
17	1	1	.....	37	17	51	5,049	1,763	12,000
18	.....	.....	2	2	.....	13	816	.....	500
19	1	.....	1	2	1	17	2,830	.....	500
20	1	.....	3	5	.....	19	175	.....	.....
	23	4	24	172	103	709	\$ 112,138	\$ 3,606	\$ 63,435

a. Allied printing trades union label was withdrawn, business fell off, and establishment closed.

TABLE No. 3.

Summary of strikes by industries in the state from July, 1894, to 1900, inclusive.

INDUSTRIES.	1894. Six months	1895.	1896.	1897.	1898.	1899.	1900.	Total
Bakeries							1	1
Barber shops							2	2
Bottling, beer and mineral wat'r					1	1		2
Brickmaking						1	3	4
Broom making				1		1		2
Building trades	1				1		37	39
Button making						4	8	12
Candy manufactories				1	1			2
Canning factories			1		1	1		3
Cereal mills	1				1			1
Cigar factories	1	6	1	1	1	11	13	34
Coffin manufactories						1		1
Cooperage		1			1	3	5	10
Egg packing plants							1	1
Freight handling (railroad)							1	1
Glove manufactories							1	1
Harness manufactories						1		1
Lumber yards		1						2
Machine shops		1				2		3
Mining (coal)	42	251	45	112	25	84	74	633
Molding, iron foundries					1		1	2
Overall manufactories		1		1	1	1	1	5
Publishing, newspapers			5	1	1	3	1	11
Plumbing and heating						19	13	32
Rivetting, shipbuilding					1			1
Railroad, construction						3	1	4
Starch, works						1		1
Street car, transportation	1							1
Switching (railroad)						1		1
Teaming and transferring			1					1
Telephone, construction				1		1	1	3
Tailoring		4			1		1	6
Theatre, stage setting						1		1
Waiters of hotel and rest'rnt.							6	7
Total.	45	265	53	118	35	143	172	831

TABLE
Summary of all strikes, all localities

BY YEARS.	Total num- ber of strikes	Total number of strikers.	Number for whom strike was under- taken.	ORDERED BY LABOR ORGANIZA- TIONS.	
				Yes.	No.
1894 (a).....	45	2,795	2,855	43	2
1895.....	30	11,130	11,161	14	16
1896.....	53	4,247	4,302	47	6
1897.....	118	5,044	5,029	114	4
1898.....	35	1,251	1,251	28	7
1899.....	49	4,110	3,524	26	23
1900.....	51	4,353	4,776	24	27
6 years, 6 months.....	(a) 381	32,930	32,818	296	85

(a) From June 30 to December 31, 1894.

No. 4.

and all industries, 1894 to 1900 inclusive.

BY YEARS.	NUMBER OF STRIKES WHICH			NUMBER OF ESTABLISHMENTS			TOTAL COST.		
	Succeeded	Partly Succeeded	Failed	Involved.	Closed	Total number days closed.	Wage loss.	Assistance.	Loss of employe.
1894 (a).....	31	.....	14	45	45	86	\$ 67,556	\$ 5,105	\$ 29,150
1895.....	28	60	176	265	252	902	621,138	27,423	152,300
1896.....	29	.....	24	53	46	418	225,834	2,224	83,400
1897.....	54	14	50	118	112	783	218,670	3,007	100,865
1898.....	20	1	7	35	18	282	44,005	5,236	24,475
1899.....	26	3	20	143	93	826	151,338	3,801	108,560
1900.....	23	4	24	172	103	709	112,138	3,606	63,435
6 yrs. 6 mos..	211	82	315	831	669	4,006	\$1,440,679	\$51,302	\$ 548,185

(a) From June 30 to December 31, 1894.

The apparent discrepancy between the number of strikes ordered and the number of strikes which were disposed of, whether they succeeded in whole or in part, or failed, arises from the fact that one strike may involve a number of establishments in which the strike is settled by separate negotiations between employers and employes of the several establishments. For example, the total number of strikes ordered from 1894 to 1900 inclusive, amounted to 381, but the number of strikes which succeeded, wholly or partly, and those which failed, amounted in all to 608, due to the fact that 608 separate settlements took place in the adjustment of the dispute. A particular instance is marginal number 17, in the year 1895, where two strikes affecting 10,000 employes, and 235 establishments appears under a column headed number of strikes as twenty successful strikes, sixty partly successful and 155 failures, a total of 235.

LOCKOUTS IN IOWA.

TABLE

Lockouts in state of Iowa by years,

Marginal No.	OCCUPATIONS.	LOCALITY.	CAUSE OR OBJECT.
1895			DES MOINES
1	Tailors	Burlington.....	Against union men by employers.....
1896			WEBSTER
2	Mine employes....	Lehigh.....	Against threatened strike for increase of wages.
1897			BOONE
3	Mine employes....	Fraser	To enforce new rules by employers.....
			POLK
4	Cigar makers.....	Des Moines.....	To compel union employes to furnish union labels for cigars made elsewhere in non-union shop
1899			SCOTT
5	Compositors.....	Davenport.....	To enforce reduction of wages by employers...
			POTTAWATTAMIE
6	Cigar makers.....	Council Bluffs.....	Against union men by employers.....
1900			WOODBURY
7	Cigar makers.....	Sioux City.....	Against union men by employers.....

No. 1—PART I.

counties and industries.

Marginal No.	Number of establishments involved.		Beginning.	Locked out employes re-employed or places filled by others.		Succeeded.	Employees.		Loss of employ-ers.
	Closed.	Not closed.		Date.	Days lasted.		Wages lost.	Assis- tance.	
COUNTY. 1895									
1	.....	1	Aug. 1	Oct. 1, 1895	61	Yes....	\$ 350	.....	\$ 500
COUNTY. 1896									
2	1	.....	July 1	July 31, 1896	30	Yes....	6,000	.....	3,000
COUNTY. 1897									
3	1	.....	May 22	Oct. 1, 1897	132	Yes....	80,000	5,000	50,000
COUNTY.									
4	1	.....	June 28	July 21, 1897	23	No	300	37	276
COUNTY. 1899									
5	.....	1	Aug. 11	Aug. 12, 1899	1	Yes....	(a).....	(a).....	(a)
(a) Not reported.									
COUNTY.									
6	.....	1	Nov. 15	Nov. 30, 1899	15	Yes...	.....	.....	500
COUNTY. 1900									
7	.....	1	Dec. 1	Feb. 1, 1901	62	Yes...	100	.....	200

TABLE NO. 1—

Marginal number.	OCCUPATION.	EMPLOYES BEFORE LOCKOUT.		
		Male.	Female.	Total.
1	Tailors	8	5	13
2	Mine employes.....	200		200
3	Mine employes.....	400		400
4	Cigar makers.....	16		16
5	Compositors	12	2	14
6	Cigar makers.....	7		7
7	Cigar makers.....	6		6

PART II.

Marginal number.	EMPLOYEES THROWN OUT OF EMPLOYMENT BY LOCKOUT.			NEW EMPLOYEES AFTER LOCKOUT.				WEEKLY WORKING HOURS.	
	Male.	Female.	Total.	Male.	Female.	Total.	Brought from other places.	Before lockout.	After lockout.
1	4	.....	4	4	.....	4	4	60	60
2	200	.....	200	.....	.....	.....	.....	60	60
3	400	.....	400	100	.....	100	100	60	60
4	16	.....	16	.....	.....	.....	.....	48	48
5	7	.....	7	7	.....	7	7	48	48
6	3	.....	3	3	.....	3	2	48	60
7	3	.....	3	3	.....	3	.....	48	60

Summarizing the lockouts in the State of Iowa from June 30, 1894, to December, 1900, inclusive, there is shown seven separate lockouts in six separate localities, viz.: Burlington, Lehigh, Fraser, Des Moines, Davenport, Council Bluffs and Sioux City. Seven separate establishments were involved, of which three were closed, and four were not closed. The duration of each lockout is from one to sixty-two days. Six of the lockouts succeeded and one failed. Wages lost \$86,750. Assistance rendered the locked out employes \$5,000. Loss to employers \$54,476. There were 649 male and seven female employes before lockout, a total of 656. There were thrown out of employment by lockout 653 employes. One hundred and sixteen new men were employed. Brought from other places 113. Weekly working hours remained the same, except in two lockouts where each of the establishments increased the time from forty-eight to sixty hours per week.

THE SHORTER WORK DAY.

THE SHORTER WORK DAY.

SECURED BY LABOR ORGANIZING IN THE UNITED STATES.

The material of which this chapter is composed is designed to fill a long felt want and has been made necessary by the many inquiries coming to the bureau from students in all walks of life.

A chronological review of the national and international trades unions, with general offices in the United States, reveal ninety-four of such organizations, eighty-nine of which reported the date they were established; their growth by decades is as follows:

Year.....	1850	1860	1870	1880	1890	1900
National and international unions ..	1	5	4	6	22	51

The total membership in these organizations is now 1,550,247.

Seventy-six organizations reported the maximum hours for a day's work previous to organization as being sixteen hours for ten crafts, fourteen hours for five crafts, twelve hours for twelve crafts, eleven hours for three crafts, ten hours for forty-seven crafts, or an average of eleven hours and one-half for a maximum day's work.

Since organization has been effected, eight crafts work twelve hours, three crafts work eleven hours, one craft works nine hours and one-half; thirty-five crafts work ten hours, seventeen crafts work nine hours and twelve crafts work eight hours, thereby showing the average length of the maximum number of hours for a day's work has been reduced to nine hours and three-quarters.

In addition to the foregoing, twenty-eight of the thirty-five crafts listed as working ten hours per day, now have the eight and nine hour work day in operation in the strongest organized localities.

The total number working on the basis of eight hours for a maximum day in the United States, as reported, is 531,085, exclusive of such employes in the service of the government who are not represented through organization.

Relative to that portion of the table following in this chapter which refers to strikes, this inquiry was confined to those strikes

which had been reported to and conducted by the general officers, and do not include such strikes as have been conducted entirely by local effort, and many of which are never made a matter of record.

The total number of strikes here recorded for 1899 and 1900, and which were conducted by the constitutional officials of the organizations, amounted to 1,427, with 1,071 successful, 179 compromised, and 177 lost. These disputes cost the treasuries of the organizations, who reported this item, a total of \$1,293,181. This expense only represents strike benefits distributed to strikers and persons involved, together with the expenses of committees or arbitrators who conducted and settled the disputes. The total number of persons involved in these strikes during 1899 and 1900 were 274,260, and the total number benefited were 285,932.

An exhaustive inquiry was also made as to the position these organizations took on the question of arbitration as a method of preventing strikes.

Compulsory arbitration is unanimously opposed.

Arbitration by outside parties who are not directly interested in the controversy and who may be specially selected by the disputants is generally regarded with favor, but only as a last resort.

Many organizations have adopted an elaborate conciliatory system, whereby the employers and employes directly interested shall settle their own differences, with provisions made to permit assistance being given by both the national representatives of the employers and of the trades organizations. This system is very successful as a rule and meets with increasing favor.

Some other organizations, the most notable being the bituminous coal miners, prefer the conference system, whereby representative employers and employes meet annually or at such times as may be previously arranged. At these conferences every point of detail is brought up for consideration and a conclusion reached by a unanimous vote of the whole conference on all matters, before adjournment. This method is highly regarded both by miners and operators, and from the record made during the last three years, the system bids fair to become permanent.

Another system to avoid strikes which is growing in popular favor is the stamping or labeling the products of labor as "union made."

Thirty-one organizations now have labels. The following table shows craft organization, date of establishing label, and the number issued:

CRAFT.	DATE LABEL WAS ESTABLISHED.	NUMBER ISSUED.
Bakers.....	1887, for 1900 only.....	82,483,000
Boot and shoe workers.....	1896, a stamp only, many millions used.	
Brewery workmen.....	1894, for 1900 only.....	13,000,000
Cigarmakers—Blue Label...	1880, for 1899 and 1900 only.....	41,024,500
Carriage workers.....	1894.....	12,000
Coopers.....	1896. No record.	
Engravers (watch).....	1900, eight months only.....	200,000
Hatters.....	1885.....	58,000,000
Leather workers.....	1897. No record.	
Metal polishers.....	1897, for 1900 only.....	500,000
Printers, pressmen, etc.....	1891, many million impressions..	
Tailors.....	1892, for 1900 only.....	1,500,000
Tobacco workers.....	1895, total to date.....	431,260,033
Trunk and bag workers.....	1899.....	20,000
Wood workers.....	1897, stamped on product, no record of quantity.	

The remainder are of recent date and have not been reported.

In addition to the foregoing synopsis of the following table of organizations, a brief statement of successful settlements of disputes without strikes is added at end of chapter.

TABLE
SHORTER
Secured by Labor Organizations

Marginal number.	NAME OF ORGANIZATION.	Date of organization.	Present membership.	NUMBER OF STRIKES DURING 1899 AND 1900.			
				Won.	Compromised.	Lost.	Total
1	Allied Metal Mechanics, Int. Ass'n of	1897	2,200	.....	.....	.....	.....
2	Bakers and Confectioners, Int. Jour. of	1886	9,000	4	.....	.....	4
3	Barbers, Int. Union of Journeymen	1896	6,900	1	.....	.....	1
4	Blacksmiths, Int. Brotherhood of	1890	10,000	2	1	.....	3
5	Boiler makers and Iron Ship B'ldrs, Bro. of	1881	5,400	59	6	5	70
6	Bookbinders, Int. Brotherhood of	1892	4,000	3	.....	.....	3
7	Boot and Shoe Workers Union	1895	13,503	7	5	1	13
8	Brewery Workers, Int. Union of United	1886	22,500	21	.....	.....	22
9	Brickmakers National Alliance	1894	3,000	6	2	2	10
10	Bricklayers and Masons Int. Union	1865	45,000	c	.....	.....	c
11	Broommakers, International	1897	1,000	9	1	.....	11
12	Carpenters and Joiners of A., U. Bhd of	1881	70,000	198	10	6	214
13	Carpenters and Joiners, Amalgamated	1860	3,000	1	1	.....	2
14	Carriage and Wagon Makers, International	1891	2,000	3	.....	.....	3
15	Carvers Ass'n of North America, Wood	1898	2,000	10	3	2	15
16	Chain Makers National Union of U. S. of A.	1900	400	b	.....	.....	.....
17	Cigar Makers, Int. Union of America	1864	35,000	149	38	27	214
18	Clerks Int. Protective Ass'n, Retail	1890	30,000	d	.....	.....	.....
19	Coopers Int. Union of North America	1890	4,500	35	6	11	52
20	Conductors, Order of Railway	1868	25,280	b	.....	.....	.....
21	Coremakers International Union	1898	4,000	b	.....	.....	.....
22	Curtain Operatives of America, Amal'd, lace	1898	1,000	1	.....	.....	1
23	Drivers, International Union, team	1898	5,000	19	4	3	26
24	Electrical Workers of America, Nat. Bro. of	1891	8,000	8	.....	.....	8
25	Engineers, Brotherhood of Locomotive	1863	35,000	b	.....	.....	.....
26	Engineers, National Bro. of Coal-hoisting	1896	950	1	.....	1	2
27	Engineers, Int. Union of Steam (stationary)	1896	7,500	5	5	.....	10
28	Engineers, Amal'd Soc. of (machinists, etc.)	1851	2,500	b	.....	.....	.....
29	Engravers, Int. Ass'n of Watch Case	1900	500	4	.....	1	5
30	Firemen, Brotherhood of Locomotive	1875	36,600	b	.....	.....	.....
31	Firemen, Int. Brotherhood of Stationary	1898	2,600	5	3	2	10
32	Fitters and Helpers, Nat. Ass'n of Steam	1888	2,000	4	1	3	8
33	Garment Workers of America, United	1891	22,000	1	3	.....	4
34	Garment Workers Union, Int. Ladies	1900	2,000	14	2	2	18
35	Glass Bottle Blowers Assn of the U. S. and C.	1847	4,000	m 15	3	.....	18
36	Glass Cutters League of America, Window	1895	900	.....	.....	.....	.....
37	Glass Flatteners Ass'n of N. A. Window	b	500	1	.....	.....	1
38	Glass Workers Union, American Flint	1878	9,000	.....	.....	.....	.....
39	Glass Workers National Union	1900	500	1	1	.....	1
40	Granite Cutters National Union	1877	12,000	1	.....	.....	1
41	Grinders National Union, table knife	1900	600	b	.....	.....	.....
42	Hatters of North America, United	1896	7,500	1	1	.....	2
43	Horse Shoers of U. S. and C., Int. Union of	1874	4,600	31	.....	.....	31
44	Hotel and Restaurant Employes, Int. L. of	1890	10,100	14	.....	.....	14
45	Iron, Steel and Tin Workers Am. Ass'n of	(b)	8,500	b	.....	.....	.....
46	Jewelry Workers Union of America, Int.	1899	1,200	1	.....	1	2
47	(g) Knights of Labor	1873	120,000	f	.....	.....	.....
48	Labor unions, Federal (A. F. of L.)	1881	235,000	46	25	12	83
49	Lathers Int., Union of Wood and Metal	1899	1,000	b	.....	.....	.....
50	Laundry Workers, International Union of	1900	5,000	b	.....	.....	.....
51	Laborers, Int., Protective Union of Building	1900	10,000	b	.....	.....	.....

No. 1.

WORK DAY

in the United States.

MARGINAL NUMBER.	Total cost of strikes to union treasuries during 1899 and 1900.	NUMBER OF PERSONS.		MAXIMUM WORKING HOURS PER DAY.			
		Involved in strikes.	Benefited by strikes.	Previous to organization.	Since organization.	Date when hours were reduced.	Number members working eight hours.
1		<i>b</i>		10	9 -10	1899	None
2	\$ 1,913	365	365	16	10 ¹ / ₂ -11	1899	None
3	175	35	35	12-16	10 -12		None
4		300	300	10	8-9 -10	1899	<i>a</i> 1,500
5	18,027	4,127	6,948	10	8-9 -10	1899	500
6	2,769	592	555	10	9	1899	<i>b</i>
7		750	750	10	10		None
8	1,500	<i>b</i>	<i>b</i>	14-18	8-9 -10	1887	11,000
9	5,500	1,075	550	10	8	1896	3,000
10		<i>c</i>	<i>c</i>	10-12	8 -9	1878	32,000
11	1,000	320	280	10	8-9 -10	1899	200
12	<i>b</i>	<i>b</i>	<i>b</i>	10	8 -9	1881	45,000
13	<i>b</i> 30,000	<i>b</i>		10	8 -9	1881	2,500
14	2,800	320	320	10	8 -9	1899	250
15	1,020	150	125	10	9	1899	<i>b</i>
16							
17	97,332	9,547	21,817	12-15	8	1886	35,000
18				14	10		None
19	4,250	911	775	13	8-9 -10	1892	500
20				<i>c</i>			
21							
22	8,950	100	100	10	9 -10	1899	<i>b</i>
23	<i>b</i>	330	250	10	10		<i>b</i>
24	10,000	3,000	2,000	10	8 -9	1892	4,000
25				<i>c</i>			
26	None	600	300	12-14	8 -12	1899	350
27	<i>b</i>	<i>b</i>	<i>b</i>	12	8 -10	1897	2,000
28		<i>b</i>	<i>b</i>	10	9 -10	1899	400
29	22,000	300	250	10	10		None
30				<i>c</i>			
31	1,500	329	265	12-14	8 -12	1898	1,000
32	18,000	900	900	10	8 -9	1890	1,500
33	625	<i>b</i>	<i>b</i>	12	9 -10	1897	1,000
34	6,500	2,000	1,800	15	9 -10	1900	None
35	335,000	1,300	1,300	10	8 ¹ / ₂	1884	3,000
36				10	8	1898	900
37	<i>b</i>	77	500	10	8	1898	500
38				10	7-8-9	1880	7,500
39	400	175	100	10	10		None
40	\$ 115,000	4,500	8,000	10	8	1899-1900	12,000
41							
42	25,000	7,500	7,500	10	9	1898	None
43	11,200	1,800	1,800	10-13	9	1878	
44	2,300	991	2,000	14-16	10-11		None
45	3,000	1,000	800	10	9 ¹ / ₂	1899	<i>b</i>
46							
47	<i>b</i>	6,922	5,896	10-12 ¹ / ₂	8-9-10	1884	<i>f</i> 100,000
48							
49				10	10		None
50							
51							

TABLE No. 1

Marginal number.	NAME OF ORGANIZATION.	Date of organization.	Present membership.	NUMBER OF STRIKES DURING 1899 AND 1900.			
				Won.	Compromised.	Lost.	Total
52	Leather Work'rs on Horse Goods, U. B. of	1896	3,700	12	.....	...	12
53	Longshoremen's Association, International	1892	20,000	12	3	7	22
54	Machinists, International Association of ...	1888	45,000	51	13	7	71
55	Meat Cutters and Butcher Workmen of N. A.	1897	8,320	...	...	...	2
56	Metal Polish'rs and Brass Work'rs U. of N. A.	1896	19,000	8	1	1	10
57	Metal Workers Int. Ass'n, Amal. Sheet	1898	3,500	1	.....	.....	1
58	Metal Workers International Union, United	1899	1,500	b	.....	.....	.....
59	Mine Workers of America, United (coal)	1890	275,000	1	1	2	4
60	Mine Workers, Progressive Union of (iron)	1897	4,500	.....	.....	5	5
61	Miners, West'n Fed. of (gold, silver, copper)	1893	40,000	.....	.....	.....	.....
62	Molders Union of North America, Iron ..	1859	20,000	19	3	20	42
63	Musicians, American Federation of	b	6,500	b	.....	.....	.....
64	Oil and Gas Well Workers, Int. Bro. of	1899	500	.....	.....	.....	0
65	Paint'rs, Dec. and Pap'rhang'rs, Am. Bro. of	1887	32,000	24	5	5	34
66	Paper Makers of Am., United Bro. of	1899	1,000	b	.....	.....	.....
67	Pattern Makers League of North America...	1887	2,400	3	.....	1	4
68	Plasterers, Int. Association of Operative ...	1882	7,120	88	0	2	90
69	Plate Printers Union of United States	1893	1,000	1	.....	.....	1
70	Plum'rs, Gas and Steam Fitters, Un. Ass'n.	1889	15,000	b	.....	.....	.....
71	Potters, National Brotherhood of Operative.	1898	2,500	b	.....	.....	.....
72	Printing Pressmen's Union, International...	1889	10,000	15	5	...	20
73	Railway Clerks of America, Order of	1898	9,000	.....	.....	.....	.....
74	Railway Employes of America, Amal. Street	1895	4,500	6	1	3	10
75	Railroad Telegraphers, Order of	1886	15,000	.....	.....	1	1
76	Railroad Trackmen, Brotherhood of	1899	4,500	b	.....	.....	.....
77	Railroad Trainmen, Brotherhood of	1883	45,000	.....	.....	.....	.....
78	Seamens Union, International	1892	9,515	.....	.....	.....	.....
79	Spinners Association, Cotton	1858	2,850	1	1	.....	2
80	Stage Employes, National Alliance of	1892	3,800	11	3	0	14
81	Switchmen's Union of North America	b	5,000	b	.....	.....	.....
82	Stone Mounters International Union	1898	1,400	4	1	1	6
83	Tailors Union of America, Journeymen	1883	9,000	32	4	0	42
84	Tile Layers Union, Int. Mosaic.	1897	800	2	.....	2	4
85	Textile Workers of America, Int. Union of A.	1896	4,000	2	.....	2	4
86	Tinplate Workers Int. Protective Union of A.	1899	2,500	.....	.....	.....	.....
87	Tobacco Workers International Union	1895	7,000	1	.....	.....	1
88	Trunk and Bag Workers Int. Union	1895	320	1	1	.....	2
89	Typographical Union, International	j 1854	32,900	11	10	15	36
90	Threshermens Protective Ass'n. of America	g	.....	.....	.....	.....	.....
91	Upholsters Int. Union of N. America	1899	1,800	8	4	2	14
92	Weavers Amal'd Ass'n. of Elastic Web.	1886	355	1	.....	.....	1
93	Weavers Protective Ass'n., American Wire	1890	235	1	.....	.....	1
94	Woodworkers, Int. Union of A. Amal'd	1873	17,500	64	2	5	71
	Totals		1,550,245	1071	179	177	1427

a. Employees of the United States government in navy yards, arsenals, etc.; 8 hours was made the maximum length of work day in such departments in 1868 (excepting in time of war.)

b. Not reported.

c. No official strikes with bricklayers since 1893. There have been some strikes of a local character, most of which were successful in reducing hours and increasing wages; the 8 hour work day prevails with bricklayers in 226 cities of the United States.

d. Strikes not indulged in.

e. Railroad service, nature of work irregular, schedule of uniform working hours per day not practical.

f. Estimated.

g. Refused to report.

h. Number of members of organization in United States, headquarters Manchester, England; the organization is world-wide and has 65,012 members.

i. Number of members of organization in United States; headquarters London, England; the organization is world-wide and has 100,000 members.

j. The original organization of compositors in the United States dates from 1854. The present International Typographical Union was established in 1869.

-CONTINUED.

MARGINAL NUMBER.	Total cost of strikes to union treasuries during 1899 and 1900	NUMBER OF PERSONS.		MAXIMUM WORKING HOURS PER DAY.			
		Involved in strikes.	Benefited by strikes.	Previous to organization.	Since organization.	Date when hours were reduced	Number members working eight hours.
52	7,025	520	520	10	10	b	a 400
53	2,500	4,500	2,700	" 10-18	" 9-12	1899	None
54	60,300	14,500	25,000	10	8-9-10	1899	a 10,000
55	12,000	1,400	16 18	10-11	9-10	1900	None
56	46,000	4,120	12,860	10	9	1899	None
57	b	b	10	10	8-9	1892	b
58	154,677	157,000	147,000	10-15	8	1898	1,000
59	b	4,500	10	10	8-9-10	1896-1900	275,000
60	112,270	2,639	1,111	10	10	1899	28,000
61				12	8-12	1899	a 600
62	11,000	12,500	12,500	10	8-9	1890	100
63				10	9-10	1890	28,000
64	3,420	460	1,000	10	8-9-10	1890	a 250
65	3,500	3,980	3,950	10	8	1893	6,000
66	b	25	100	8	a 1868	1886	1,000
67	b	b	b	10†	8	1886	15,000
68	b	b	10	8	1899	b	None
69	b	2,000	b	10-12	10-12	b	None
70				12-18	10-12	b	None
71				12-18	11	b	None
72				10†	10	b	None
73				12	12	b	None
74	None	35	35	11	10	b	None
75	14,000	1,300	1,200	b		b	None
76				10	10	b	None
77	\$ 250	250	230	† 12	10	1897	None
78	29,418	6,010	5,060	† 10	8	1899	800
79	b	33	33	† 10	10	1899	None
80		2,765	1,265	† 12	8-10	1899	500
81	6,000	100	100	10	8-9-10	1896	1,400
82	550	70	60	10	10	1899	None
83	92,504			† 10-12	8-9	1899	10,000
84				10	10	b	None
85	3,000	300	200	10	9	1887	235
86	400	4	4	10	8	1890	8,000
87	4,000	12	12	10	8-9-10	1899	
88	4,906	4,931	4,431	12			
89							
90							
91							
92							
93							
94							
Totals.	\$ 1,203,181	274,260	285,932	* 11.5	* 9.7		531,085

k. Includes 13,639 non-unionists.

l. 1900 only.

m. The glass bottle blowers maintained one strike in New Jersey which cost the National treasury of that union \$200,000; it succeeded, benefitting 800 employes and embraced 11 firms.

n. Longshoremen are employed intermittently and most of them only during season of navigation; they cannot, as a consequence, ask for an eight-hour day consistently; 12 hours per day is now the maximum; all over that paid for at the rate of double time.

o. Butcher workmen in retail markets where organized have reduced the length of their working day from 16 hours to 11 and abolished Sunday work.

p. Flint glass workers have what is called a limited system of so much of a certain quality of ware for a days' work; as the operator gains in skill he reduces the length of his work day, many working only 7 hours and less per day; they average \$1,000 per year.

† And over; hours worked previous to organization in such cases were unlimited, entirely at the discretion of employers; generally without extra remuneration.

* Average.

ADVANTAGES GAINED BY ORGANIZATIONS WITHOUT STRIKES DURING 1899 AND 1900.

BAKERS—Gained ten per cent. increased wages; secured a reduction in hours of one per day affecting 500 people; obtained recognition of the union generally.

BARBERS—General improvement in working conditions. Some localities have reduced hours from thirteen and over to eleven per day, the majority have reduced the hours to an average of twelve per day; have advanced the rate of wages in many places twenty per cent.

BLACKSMITHS—Gains in wages and reductions in hours have been secured in a majority of cases with the blacksmiths by conciliatory means.

BOILERMAKERS—In seven cities gained one hour less per day with ten per cent. increased wages; in one city twenty per cent. increased pay; in one city secured the eight hour day without reduction in pay.

BOOKBINDERS—Gained in wages, an average of twenty per cent.; in some cases as high as \$6.00 per week; reduced hours from ten to nine per day generally.

BOOT AND SHOE WORKERS—Secured increase of \$2.50 and \$3.00 per week in wages in several cities; better prices and working conditions gained by conciliatory means and the union stamp.

BREWERY WORKERS—General improvement in working conditions, more considerate treatment by bosses; increased wages and reduction of working hours secured in many places by conciliation.

BRICKMAKERS—Had to strike for everything we got but were amply repaid as it obtained for us the eight hour day and a raise of pay

BROOMMAKERS—200 members secured fifteen per cent. increase of wages and one shop the eight hour day.

CARPENTERS—As organization develops the eight hour day follows which we usually gain without striking; have also secured the Saturday half holiday and 2½ cents per hour increased pay

CARRIAGE WORKERS—Fifty members secured a reduction of working hours without reduction of wages; eighty others secured increased wages. Better factory conditions.

CARVERS—Two hundred members got twenty-five cents a day increase of wages; 200 secured the eight hour day without decreased pay; generally we were driven to strike before we could make ourselves understood that we were in earnest.

CIGAR MAKERS—Had a great many strikes, but the majority of difficulties settled without strikes; eight hour day prevailed; greater demand for blue label goods than ever.

CLERKS—Continue to gain reductions in working hours and receive the blessing of Sunday observance which was absolutely impossible without organization; better working conditions granted which have an important bearing on our health and comfort.

COOPERS—Increased wages and reduced hours have been secured in many places without strikes.

CURTAIN OPERATIVES—Gained reduction of working hours; better factory conditions; fifteen per cent increase of wages.

TEAM DRIVERS—Better working conditions for man and beast but we are frequently driven to strike or threaten a strike before it is obtained.

ENGINEERS—(Coal Hoisting)—Twenty per cent increase of wages and a reduction of four hours per day for 500 men; the blessing of Sunday observance is afforded us too in many instances.

ENGINEERS—(Locomotive)—Close organization, careful preparation of grievances, determined efforts, everlasting vigilance for our rights have made strikes almost unnecessary.

FIREMEN—(Stationary)—Nine hundred men work eight hours instead of twelve; this puts more men to work gives all a chance to live, and to see our families in day light.

FIREMEN—(Locomotive)—Advantages too numerous to specify we avoid strikes by organizing more solidly.

FITTERS GAS AND STEAM—Strikes had to be resorted to in every instance to secure our demands.

GARMENT WORKERS—(Men's apparel)—Eighteen shops unionized without strikes which meant higher wages and reduced hours in every instance.

GARMENT WORKERS—(Ladies' apparel)—Eighteen shops unionized without strikes, gaining twenty-five to thirty per cent. increase of wages.

GLASS BOTTLE BLOWERS—Few advantages gained without strikes.

GRANITE CUTTERS—Advantages gained without strikes are not many, but by those means we have gained recognition of our union in every locality where we are organized in the United States and we have also secured the adoption of official agreements.

HATTERS—Many advantages gained without strikes, largely influenced by the patronage given our union label.

HOTEL EMPLOYES—(Waiters, etc.)—Many advantages secured, chief of which are better conditions, sanitary and otherwise, making the employment more endurable.

LATHERS—Every local made demands for more wages and less hours; nearly all won without any strikes of importance.

LEATHER WORKERS—Continual gains of increased wages and reduced hours without strikes.

MACHINISTS—One hundred and twenty disputes settled without the loss of a day, which secured advantages of recognition, more pay, less hours, and other important shop regulations.

MEAT CUTTERS—(Butcher workmen)—Better wages, shorter hours, pay for overtime, and better working conditions have been secured in numerous instances.

METAL POLISHERS—3,500 members secured an increase in wages of twenty-five cents per day; better working conditions were secured in every case where complaints were made.

MINE WORKERS—(Coal)—A general increase of twenty per cent. in wages was secured by means of joint conferences with employers of bituminous coal miners, in Pennsylvania, Ohio, Indiana, Illinois and Iowa. \$20,000,000 is a fair average of the total amount of increased wages secured for the bituminous miners during the past year without strikes.

MINERS—(Gold, silver and copper)—Legislative means are employed to secure better terms and conditions, this method is found far more efficient than striking.

MOLDERS—Yearly agreements, defining minimum rates of wages, maximum hours, improved shop facilities and conditions less irksome to the molders is a small part of the advantages obtained without strife.

OIL AND GAS WELL WORKERS—Gained fifty cents a day of twelve hours, and labor day as a holiday and other minor concessions.

PAINTERS—As our organization grows and the employers

patience expands, we find strikes become less necessary, although they have been frequent in the past, many concessions were obtained during the past two year.

PATTERN MAKERS—Many strikes of a minor character took place in order to test the challenge "That pattern makers would not strike anyhow." Serious disputes have not been necessary; reasonable concessions have been secured easily by conferences.

TELEGRAPHERS, (RAILROAD)—Made enormous gains in the the wages of members, hours should be reduced, have not materially shortened them yet, but have taken extra work off telegraphers which properly belonged to other labor, many disputes successfully adjusted.

TRACKMEN, (RAILWAY)—\$200,000 a year has been secured for the trackmen on five large railroad systems in the shape of increased wages, in addition to a reduction of hours, and pay for overtime which previously had not been granted.

TAILORS—Tendency is upward for better shop conditions, better pay and shorter hours, all the advantages which have been gained without strikes have not been reported to the general office. Bad news always travels faster and more directly than good news. Our records show that at least \$25,000 more wages are being paid tailors annually this year than last, for the same class and quantity of work.

TIN PLATE WORKERS—Reduced the hours of labor from twelve to ten per day.

TOBACCO WORKERS—As the demand for goods with our union label increases the necessity for our organization striking proportionately decreases, as a consequence wages are increased and hours reduced, with the assurance that shop conditions are healthy, and comfortable.

TRUNK AND BAG WORKERS—A few improvements in our general condition without striking have been conceded, which have been gratefully appreciated.

TYPOGRAPHERS—One hundred and sixty-five localities successfully reduced their working hours from fifty-nine and sixty per week to fifty-seven and fifty-four without strikes. Succeeded in unionizing and thereby humanizing several offices which had been non-union for years. Strikes with printers are getting rare.

ADVANTAGES GAINED BY RAILROAD ORGANIZATIONS DURING 1899 AND 1900—WITHOUT STRIKES.

The following is only a brief synopsis of what was accom-

plished by the different railroad organizations throughout the United States during 1899 and 1900, and refers to the trainmen and conductors in the main, and partially to the engineers and firemen. Other railroad employes, such as machinists, boilermakers, etc., are included in previous pages :

New schedule of wages for trainmen and yardmen, including regulation of hours and rules favorable to the men. Norfolk and Western Ry.

Full restoration of wage scale prior to reduction in 1894, for engineers, firemen, conductors and trainmen. Louisville and Nashville R. R.

Standard pay for trainmen and switchmen at Ogden, Utah, and Algiers, La. Southern Pacific R. R.

New schedule for increased wages ; regulations of hours and rules favorable to employes. Viz. conductors, brakemen and yardmen. Cotton Belt R. R.

Eight-hour day for yard crews at Boston, Mass. New York, New Haven and Hartford R. R.

New schedule of wages, hours and rules secured favorable to yard employes on the whole system of the Colorado and Southern R. R.

New schedule of wages, hours and rules for conductors, brakemen and yardmen secured on the Santa Fe R. R. system.

New schedule of increased wages, regulation of hours and rules for conductors, brakemen and yardmen on the Southern California system.

Conductors and trainmen secured the establishment of a nine-hour day in through freight service and a new schedule of increased wages, with satisfactory rules for train and yard service, on the Canadian Pacific R. R.

Conductors and trainmen secured the ten-hour day for through and local freight service, a new schedule with material increase of pay and new rules for yard and train service, on the Delaware, Lackawanna and Western R. R.

Conductors and trainmen in train and yard service obtained new schedule of wages, hours and rules, to cover two years, on Mobile and Ohio R. R.

Trainmen secured new schedule of wages, hours and rules in their favor on Lake Shore and Michigan Southern R. R.

Conductors, baggagemen, trainmen and yardmen obtained fair increase of wages and schedule of ten hours in freight service, together with better rules, on Grand Trunk R. R.

New schedule of increased wages, better rules and regulated hours of service for conductors, brakemen and yardmen on Western New York and Pennsylvania R. R.

Conductors, trainmen, baggagemen and yardmen succeeded in establishing the ten hour day for through freight service, and pay for overtime was granted where no such pay had previously been allowed, together with material increase of wages on the Central Vermont R. R.

Trainmen, baggagemen and yardmen secured new schedule of wages, hours and rules favorable to men on Baltimore & Ohio R. R. system.

Conductors, trainmen and yardmen secured standard rate of pay in various localities on Kansas City, Pittsburg & Gulf R. R.

Conductors, baggagemen, trainmen and yardmen were conceded an increase of pay corresponding to schedule paid in 1893 on Cleveland, Cincinnati, Chicago & St. Louis R. R.

The ten hour day in yards, and eleven hour day in through freight service was secured together with increase of wages for trainmen, baggagemen and yardmen on the Boston & Maine R. R.

Restoration of wage scale prior to 1893, for conductors and trainmen on the Southern R. R. system.

Increased pay with other adjustments obtained by conductors and trainmen on Missouri, Kansas & Texas R. R.

New schedule with increased wages for conductors, trainmen, baggagemen and yardmen secured on the Maine Central R. R.

Joint schedule for increased wages for engineers, firemen, conductors and trainmen on the Wheeling & Lake Erie R. R.

New schedule and improved working conditions for conductors, brakemen and yardmen was obtained on the Pittsburg, Bessemer & Lake Erie R. R.

Old agreement revised with better rules governing service and material increase of pay at several points for conductors and trainmen on Illinois Central R. R.

Revised agreement for conductors, trainmen and yardmen with increase of pay to such employes on the Erie R. R. system.

Satisfactory adjustment of all grievances including allowance for overtime for all employes on Denver & Rio Grande R. R.

Reduction of length of work day in freight train service, and dinner hour conceded, with increased wages for yardmen at all points on the Pennsylvania R. R., east of Pittsburg and Erie.

Satisfactory adjustment of grievances affecting all classes of

labor in train service, including engineers, firemen, conductors, and trainmen on the Union Pacific R. R. system.

New schedule of wages, constituting a general increase combined with improved working conditions, for engineers, firemen, conductors, and trainmen on the Wabash R. R. system.

Revised agreement for conductors, trainmen and yardmen, giving increased wages, improved working conditions, and other important adjustments, secured on the Southern Pacific R. R. system.

Joint agreement for engineers, firemen, conductors, trainmen, and yardmen, giving increased wages, a ten-hour day in road and yard service, with extra pay for overtime not previously granted, on the Buffalo & Susquehanna, and Delaware & Hudson R. R.'s.

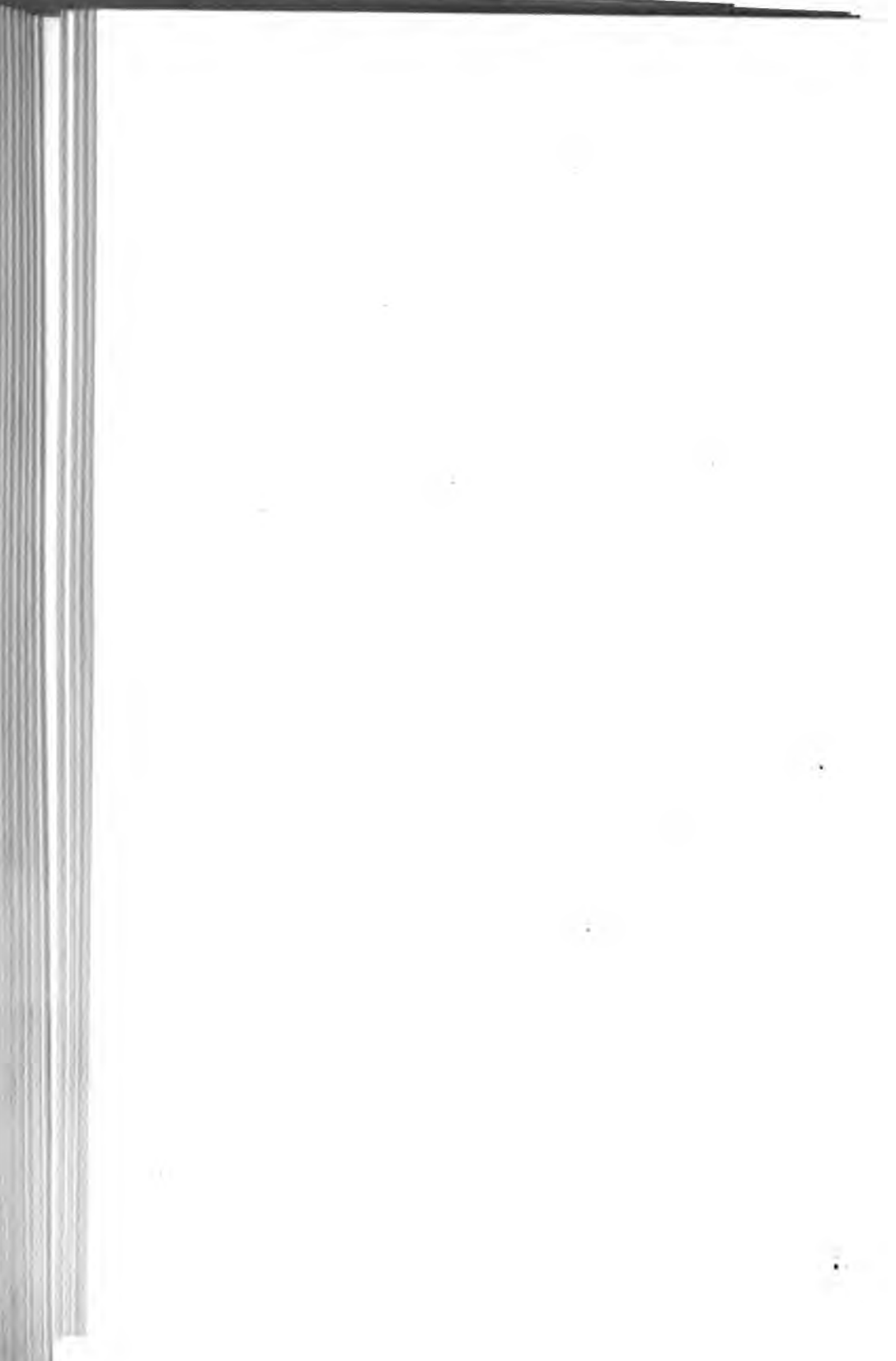
Revised agreement with increase of wages and improved regulation of hours for conductors, trainmen and yardmen, on the Michigan Central R. R.

Increased wages, the adoption of the ten-hour day in all yards and improved working conditions, secured for conductors and all yardmen, including pay for overtime not previously allowed, on the Missouri Pacific R. R.

Revised schedule of wages, constituting an increase for engineers and firemen, on the Chicago & North-Western and the Chicago, Milwaukee & St. Paul R. R. systems.

These favorable results are only a few of the many which have been secured by mutual conferences between the employees and the officials, and constitute only some of those which have been reported to the general officers of the organizations in question, during 1899 and 1905.

COST OF BUREAUS.



COST OF BUREAUS' OF LABOR STATISTICS.

The support given a statistical bureau determines its real usefulness and a scant appropriation will certainly handicap the efforts of the best disposed official. It is entirely proper to show that where bureaus have been generously supported they have reached their greatest point of usefulness.

In this connection I give in the following tables the authorized expenditures of thirty one bureaus, including those of the province of Ontario and the Dominion of Canada. On the basis of per capita Iowa spends the least, viz: \$1.68 per thousand of population. The information contained in these tables has been obtained through correspondence with the different bureaus and from the laws governing the different bureaus.

Of the thirty-one bureaus reporting, twenty-three report factory inspection authorized by statute. Eight bureaus report as having no factory inspection laws. Sixteen bureaus report their factory inspection department as being under the supervision of and attached to bureau. Twenty-five bureaus report that either they do not have factory inspection or that that branch is managed independent of the bureau. Twenty-one bureaus report having authority to enforce demands. Eleven bureaus report as having no authority.

The aggregate appropriations for the thirty-one bureaus reporting amounts to \$527,197, an average for each bureau of \$17,006.35. The aggregate number of employes, including factory inspectors, for the thirty-one bureaus, is 389, an average of thirteen for each bureau.

The length of terms of office range from two to five years, and two bureau chiefs retain office *during good behavior*. One bureau five years; ten bureaus four years; sixteen bureaus two years; two bureaus three years. The salaries of commissioners range from \$1,000 to \$3,500.

STATE BUREAUS OF LABOR STATISTICS OF THE DIFFERENT COMMONWEALTHS.

Marginal number.	STATE.	Number employed in bureau.	APPOINTMENT.		Term of office.	SALARIES.			GENERAL EXPENSE.			
			Commissioner.	Assistants.		Commissioner.	Deputy.	Clerks.	Office.	Traveling.	Printing.	
1	California	5	By governor	By Com.	4 years.	\$3,000	\$1,800.	\$2,500	\$600			\$625
2	Colorado	1	Sec'y of state	Commissioner	2 years.	1,800	1,800		400			
3	Connecticut	1	Governor	Commissioner	4 years.	5,000	3,500	4,600	2,000	No report	No report	No report
4	Illinois	2	Governor	Secretary	2 years.	1,200	None	No report	10,000 to 4,000	No report	No report	No report
5	Indiana	2	Governor	None	4 years.	3,600	None	No report	1,400	No report	No report	No report
6	Iowa	2	Governor	Commissioner	2 years.	1,500	1,000	None	All necessary	\$500	All necessary	All necessary
7	Kansas	2	Elected	Elected	2 years.	1,500	1,200	1,500	800	1,500	1,500	No report
8	Kentucky	4	Elected	Commissioner	4 years.	On voucher.	On voucher.	On voucher.	On voucher.	On voucher.	On voucher.	On voucher.
9	Louisiana	9	Governor	Commissioner	4 years.	1,500	1,500	None	1,000	None	None	No report
10	Maine	3	Governor	Commissioner	2 years.	1,500	No report	No report	2,000	No report	No report	No report
11	Maryland	2	Governor	Commissioner	2 years.	No report	No report	No report	No report	No report	No report	No report
12	Massachusetts	26	Governor	Commissioner	2 years.	No report	No report	No report	No report	No report	No report	No report
13	Michigan	21	Governor	Commissioner	2 years.	2,000	1,500	No report	No report	No report	No report	No report
14	Minnesota	7	Governor	Commissioner	2 years.	2,500	1,500	2,000	No report	No report	2,000	No report
15	Missouri	9	Governor	Commissioner	2 years.	No report	No report	No report	No report	No report	No report	No report
16	Montana	6	Governor	Commissioner	4 years.	2,500	1,500	None	2,500	None	None	No report
17	Nebraska	3	Governor	Commissioner	2 years.	1,500	1,000	800	1,350	None	None	No report
18	New Hampshire	3	Governor	Commissioner	3 years.	1,500	1,000	None	800	None	None	No report
19	New Jersey	6	Governor	Commissioner	5 years.	No report	No report	No report	No report	No report	No report	No report
20	New York	59	Governor	Commissioner	3 years.	3,500	2,500	13,500	21,000	No report	No report	5,000
21	North Dakota	2	Governor	Commissioner	2 years.	No report	No report	No report	500	None	None	None
22	North Carolina	3	Elected	Commissioner	4 years.	2,000	No report	No report	740	No report	No report	No report
23	Ohio	5	Governor	Commissioner	2 years.	2,000	1,300	2,010	9,400	150	150	No report
24	Pennsylvania	5	Sec'y of state	Commissioner	4 years.	No report	No report	No report	No report	No report	No report	No report
25	Rhode Island	4	Labor Com.	Commissioner	2 years.	2,000	No report	No report	No report	No report	No report	No report
26	Tennessee	2	Governor	Commissioner	2 years.	No report	No report	No report	No report	No report	No report	No report
27	Washington	2	Governor	Commissioner	4 years.	3,600	No report	No report	No report	No report	No report	No report
28	West Virginia	2	Governor	Commissioner	4 years.	1,200	None	500	1,800	No report	No report	No report
29	Wisconsin	15	Governor	Commissioner	2 years.	2,000	1,500	2,761	2,400	All expense	All expense	No report
30	Canada	10	Gov. Gen'l.	Deputy m. lster	Good b'hr	No report	No report	No report	No report	No report	No report	No report
31	Ontario	2	Lieut. Gov.	Deputy	(Good b'hr	No report	No report	No report	600	No report	No report	No report

Marginal number.	STATE.	Author- ized by statute.	Number of em- ployes.	Whether attached to bureau.	FACTORY INSPECTION.					Total ex- pense for bureau and factory inspector.	Amount of appropria- tion.
					Measure of authority.	SALARIES.		EXPENSE.			
						Chief Inspec- tor.	Deputy.	Travelling.	Other.		
1	California	Yes	No report	Yes	Statutory .....	.....	.....	.....	.....	\$ 8,525	
2	Colorado	No	3	No	Statutory	\$1,500	\$3,000	\$1,000	\$10,800	2,200	\$ 30,700
3	Connecticut	Yes	14	Yes	Statutory	1,800	1,000	No Limit	7,500	31,610	
4	Illinois	Yes	4	No	Statutory .....	.....	.....	.....	.....	.....
5	Indiana	Yes	2	Yes	None	None	None	None	None	None	
6	Iowa	Yes	No	Yes	Statutory	None	None	None	None	None	
7	Kansas	No	No report	No	Statutory	None	None	None	None	None	
8	Kentucky	No	No report	No	None	None	None	None	None	None	
9	Louisiana	No	No report	Yes	Statutory	None	No Report	No Report	No Report	3,500	
10	Maine	Yes	No	No	Statutory	None	None	None	None	None	
11	Maryland	No	No report	No	None	No Report	None	None	None	None	
12	Massachusetts	Yes	26	No	Police power	No Report	No Report	No Report	No Report	20,500	
13	Michigan	Yes	14	Yes	Statutory	No Report	No Report	No Report	All expenses \$20,000	29,500	
14	Minnesota	Yes	8	Yes	Police power	1200	200	No Report	No Report	12,200	
15	Missouri	Yes	No	Yes	Statutory	No Report	None	No Report	No Report	28,200	
16	Montana	No	No report	No	None	None	None	None	None	None	
17	Nebraska	Yes	No report	Yes	Statutory	No Report	None	None	None	6,500	
18	New Hampshire	No	7	No	None	None	None	None	None	4,992	
19	New Jersey	Yes	29	No	Police Power	None	No Report	No Report	No Report	3,300	
20	New York	Yes	No	Yes	Police Power	No Report	No Report	No Report	No Report	6,000	
21	North Dakota	No	No report	No report	None	No Report	No Report	No Report	All expense, \$64 172	124,572	
22	North Carolina	No	4	No	None	No Report	No Report	No Report	None	4,000	
23	Ohio	Yes	14	No	Police Power	2,000	13,800	7,000 co.	No Report	3,500	
24	Pennsylvania	Yes	28	No	Police Power	1,800	1,100	No Report	20,800	29,000	15,200
25	Rhode Island	Yes	2	Yes	Police Power	No Report	No Report	No Report	No Report	5,000	
26	Tennessee	Yes	1	Yes	Police Power	No Report	No Report	No Report	No Report	4,000	
27	Texas	Yes	1	Yes	None	No Report	No Report	No Report	No Report	620	
28	Washington	Yes	1	Yes	Police power	No Report	No Report	No Report	No Report	3,500	
29	West Virginia	Yes	8	Yes	Statutory	1,200	7,000	All Expenses	No Report	34,000	
30	Wisconsin	Yes	No	Yes	Police Power	No Report	No Report	No Report	No Report	50,000	
31	Canada	Yes	No report	No	No report	No Report	No Report	No Report	No Report	2,500	
32	Ontario	Yes	No report	No report	Police Power	No Report	No Report	No Report	No Report	2,500	

*Salary of commissioner of the State of Missouri is not paid out of the \$23,000 appropriation, but from what is known as the "civil list."

An analysis of the foregoing table shows that the *California* bureau conducts factory inspection through the regular office force.

Colorado on the other hand has no factories to speak of and consequently no factory inspection.

Connecticut, with a total annual appropriation of \$31,700, covering all the phases of bureau work, devotes a great portion of its funds to factory inspection and the maintenance of "Free employment offices," which are managed directly by the bureau.

Illinois bureau is in charge of the secretary of the labor commissioners, who has supervision over the "Free employment offices" in Chicago and Peoria, as well as the factory inspection, in addition to the usual duties of the labor commissioner. This state spends \$10,000 for factory inspection, and \$10,400 in maintaining its "Free employment offices."

Indiana has two labor commissioners, two deputies and stenographers, and their factory inspection is conducted under the supervision of the bureau.

Iowa bureau has conducted factory inspection during the last biennial period, in addition to other duties.

Kansas elects its labor commissioner through an association of labor organizations called "The Society of Labor and Industry." The Kansas bureau conducts factory inspection in addition to its other duties.

Kentucky chooses its commissioner by popular vote and his duties consist mainly in gathering statistics of agriculture.

Louisiana bureau is of recent origin; as yet they have no factory inspection.

Maine, one of the oldest bureaus, has a comparatively small appropriation at its disposal.

Maryland has no factory inspection, the bureau devoting the time largely to statistical work.

Massachusetts, the best organized and equipped state bureau in the United States, shows what generous appropriations can do for an institution. Factory inspection is a separate department in that state.

Michigan has one of the best supported bureaus and time has proven the wisdom of their policy of liberality.

Minnesota bureau conducts factory inspection in addition to its purely statistical duties.

Missouri's bureau carries on factory inspection, and conducts

several "Free employment offices," which are becoming both useful and popular.

Montana bureau conducts a "Free employment office" in Helena, of which mention is made elsewhere in this report.

Nebraska bureau has for years conducted factory inspection together with its other duties.

New Hampshire bureau has no specific appropriation for its expenses. The salaries and office expenses of the bureau amount to \$3,300.

New York bureau conducts both factory inspection and "Free employment offices" and has much greater total appropriations than any other state in the union.*

North Dakota, though a comparatively new state, grants its bureau a much larger appropriation than many of the older states.

North Carolina elects its labor commissioner by popular vote. The annual appropriation for its support is \$3,500.

Ohio has a separate factory inspection department aside from the bureau of labor statistics. The bureau has general supervision of the "Free employment offices," which are paid for by the municipalities in which they are located.

Pennsylvania bureau does not have charge of the factory inspection in the state, its duties being confined to statistical matters entirely.

Rhode Island has factory inspection in connection with the regular bureau work.

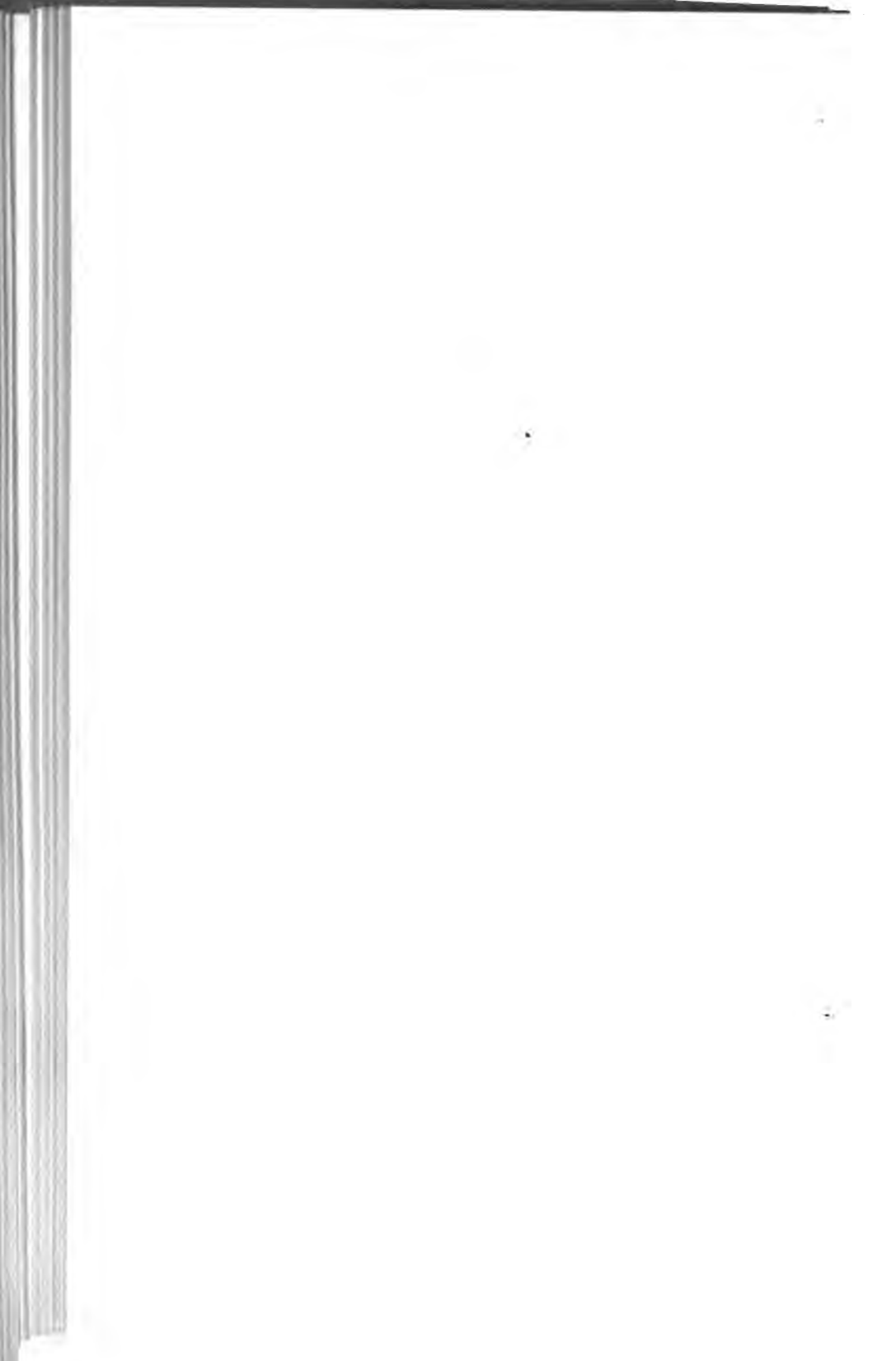
Tennessee bureau conducts factory inspection in connection with its regular bureau work.

Washington bureau has charge of both the factory inspection and the "Free employment offices" of the state.

Wisconsin has the most satisfactory factory inspection system from all reports, and their child labor and factory laws are models.

Canada. The Dominion appropriates \$50,000 a year for its bureau of labor statistics.

Ontario has factory inspection under the charge of the labor commissioner.



STATUTORY INVESTIGATION.

STATUTORY INVESTIGATION—PART I.

ADAMS COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
			1899.		1900.	
			Males.	Females.	Total.	Total.
1	Brick and tile manufacturing	1	6	.....	6	6
2	Coal mining ..	3	28	.....	28	16
3	Hotel	1	3	4	7	7
	Total	5	37	4	41	29

ALLAMAKEE COUNTY.

1	Button blanks	1	18	.....	18	50
2	Carriage and wagon manufacturing	2	22	.....	22	24
	Total	3	40	.....	40	74

APPANOOSE COUNTY.

1	Coal mining	23	1,426	.....	1,426	1,800	1	1,801
2	General merchandise	2	14	10	24	7	4	11
3	Hotel	1	5	6	11	4	6	10
4	Laundry, steam	1	8	3	11	9	4	13
5	Newspaper and job printing	1	4	5	9	6	6	12
6	Wholesale merchandise, hardware and agricultural implements	1	12	3	15	18	2	20
	Total	29	1,469	27	1,496	1,844	23	1,867

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				AVERAGE number of weeks in operation.				INCREASE OR REDUCTION OF DAILY WAGES DURING—			
		1899.		1900.		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	1899.	1900.	Increase (per cent.)	Reduction (per cent.)	Increase (per cent.)	Reduction (per cent.)
1	Brick and tile manufacturing	\$ 758	.....	\$ 758	\$ 1,175	.....	\$ 1,175	26	25	.....	.....	.....	.....
2	Coal mining	\$ 3,197	.....	\$ 3,197	\$ 2,800	.....	\$ 2,800	26	23	.....	.....	.....	.....
3	Hotel	\$ 576	\$ 831	\$ 1,410	\$ 900	\$ 468	\$ 1,438	52	52	.....	.....	.....	.....
	Total	\$ 4,424	\$ 814	\$ 5,358	\$ 4,935	\$ 468	\$ 5,403	.....	.....	.....	.....	.....	.....

CAUSE OF INCREASE OR REDUCTION: 1 Demand for coal and organization of miners. 2 Over-production.

ALLAMAKEE COUNTY.

1	Button blanks	\$ 4,000	.....	\$ 4,000	\$ 19,380	.....	\$ 19,380	32	50	.....	.....	.....	.....
2	Carriage and wagon manufacturing	\$ 6,636	.....	\$ 6,636	\$ 8,750	.....	\$ 8,750	50	52	.....	.....	.....	.....
	Total	\$ 10,636	.....	\$ 10,636	\$ 28,130	.....	\$ 28,130	.....	.....	.....	.....	.....	.....

APPANOOSE COUNTY.

1	Coal mining	\$ 503,330	.....	\$ 503,330	\$ 652,230	.....	\$ 652,230	30	30	.....	.....	.....	.....
2	General merchandise	\$ 7,904	.....	\$ 7,904	\$ 2,880	.....	\$ 2,880	52	52	.....	.....	.....	.....
3	Hotel	\$ 540	.....	\$ 540	\$ 936	.....	\$ 936	52	52	.....	.....	.....	.....
4	Laundry, steam	\$ 730	.....	\$ 730	\$ 900	.....	\$ 900	16	20	.....	.....	.....	.....
5	Newspaper and job printing	\$ 2,020	.....	\$ 2,020	.....	.....	.....	52	52	.....	.....	.....	.....
6	Wholesale merchandise, hardware and agricultural implements	\$ 5,000	.....	\$ 5,000	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Total	\$ 519,504	\$ 5,019	\$ 524,523	\$ 663,612	\$ 3,376	\$ 670,188	.....	.....	.....	.....	.....	.....

a Average. b Includes board and room. c Separate accounts for males and females not reported.

CAUSE OF INCREASE OR REDUCTION: 1 Organization of labor and operators. 2 Miners organization insisted on increase. 3 Efficiency of help.

STATUTORY INVESTIGATION—PART I—CONTINUED.

BENTON COUNTY.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Brick and tile manufactory	1	1	18	.....	18	15	.....	15
2	Canning factory, vegetables	.....	1	.....	.....	.....	44	39	83
3	General merchandise	1	1	6	2	8	6	3	9
4	Pearl button factory (<i>n</i>)	.....	.....	.....	.....	.....	.....	.....	.....
5	Printing and publishing	1	1	5	1	6	5	1	6
	Total.....	3	4	29	3	32	70	43	113

n Not reported.

BLACK HAWK COUNTY.

1	Agricultural implement manufactory	n	1	.....	.....	.....	12	.....	.....
2	Brick and tile works	1	1	15	.....	15	22	.....	22
3	Broom manufactories	n	.....	.....	.....	.....	.....	.....	.....
4	Canning vegetables	1	1	30	70	100	284	239	523
5	Cement sidewalk contracting	n	.....	.....	.....	.....	.....	.....	.....
6	Clothing manufactories, overalls, skirts	2	2	9	31	40	10	48	58
7	Cigar manufactory	1	1	.....	.....	.....	10	3	13
8	Creamery supplies manufactories	1	2	9	3	12	10	3	13
9	Dry goods, notions, etc.	1	1	50	.....	50	53	30	83
10	Egg case manufactory	1	1	18	.....	18	9	20	29
11	Gas lighting and heating	1	1	4	20	24	4	13	17
12	Hardware and plumbing	1	1	5	.....	5	2	.....	2
13	Hotel	2	2	12	1	13	6	.....	6
14	Laundry, steam	6	5	24	49	73	22	40	62
15	Life insurance	1	1	5	15	20	7	18	25
16	Machine, engine, boiler and tank manufacturers	1	n	5	6	11	137	3	140

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.						Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.			1900.			1899.	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.			In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
1	Brick and tile manufactory.....	\$ 2,826	.....	\$ 2,826	\$ 3,097	.....	\$ 3,097	26	40	.....	.....	.....	.....
2	Canning factory, vegetables.....	.....	.....	12,120	17,687	.....	17,687	*	32	.....	.....	.....	.....
3	General merchandise.....	2,382	610	2,992	2,642	.....	3,512	52	52	.....	.....	5.00	.....
4	Pearl button factory (w).....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	Printing and publishing.....	1,800	200	2,000	1,900	450	2,350	52	52	.....	.....	.....	.....
	Total.....	\$ 7,008	\$ 810	\$ 7,818	\$ 23,759	\$ 2,887	\$ 26,646	.....	.....	.....	.....	.....	.....

* Not reported.

CAUSE OF INCREASE OR REDUCTION: / Slight increase to part of force account of efficiency. NUMBER WEEKS OPERATED: * 4 full, 26 short.

BLACK HAWK COUNTY.

1	Agricultural implement manufactory.....				\$ 9,318		\$ 9,318		
2	Brick and tile works.....	\$ 3,400		\$ 3,400	5,359		5,359		
3	Broom manufactory.....	3,000	1,000	4,000	19,000		27,500		
4	Canning vegetables.....				1,120		1,120		
5	Cement sidewalk contracting.....	4,800	4,700	9,500	2,940		8,302		
6	Clothing manufactories, overalls, skirts.....	4,200	600	4,800	4,400		4,850		
7	Cigar manufactory.....	10,400		10,400	22,750		24,650		
8	Creamery supplies manufactories.....	5,000	6,300	11,300	6,000		7,000		
9	Dry goods, notions, &c.....								
10	Egg case manufactory.....	1,700		1,700	3,945		3,671		
11	Gas lighting and heating.....				1,760		1,000		
12	Hardware and plumbing.....	6,068	10,221	16,289	3,900		3,960		
13	Hotel.....	2,200	3,200	5,400	4,932		5,400		
14	Laundry, steam.....	6,000	500	6,500	2,500		6,500		
15	Life insurance.....								
16	Machine, engine, boiler and tank manfrs.....	60,445	1,032	61,477	68,225		69,365		

STATUTORY INVESTIGATION—PART I—CONTINUED.

BLACK HAWK COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYES DURING YEAR.					
		1899	1900	1899.			1900.		
				Males.	Females.	Total.	Males.	Females.	Total.
17	Mattress and furniture manufactory.	1	2	6	3	9	6	6	12
18	Merchant tailoring.	2	2	58	20	78	70	10	80
19	Milling flour and grain.	2	6	58	9	67	75	11	86
20	Newspapers, printing and publishing.	4	6	35	1	36	38	2	40
21	Pork packing.	1	1	137	2	139	154	1	155
22	Refrigerators, bank and store hard wood fixtures, manufactures.	3	3	45	45	90	44	17	61
23	Sorghum manufactory.	2	2	80	45	125	18	1	19
24	Telephone line and exchanges (local).	1	1	89	7	96	15	1	16
25	Wholesale drugs.	2	1	89	7	96	15	1	16
26	Wholesale fruits and commission.	2	2	89	7	96	15	1	16
27	Wholesale groceries.	4	2	89	7	96	48	6	54
	Total.	42	50	821	208	1119	1066	441	1505

28 Not reported.

BOONE COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1899	1900	1899.			1900.		
				Males.	Females.	Total.	Males.	Females.	Total.
1	Blank book manufactory.	2	1	20	11	31	7	5	12
2	Brick and tile manufactories.	4	4	504	504	1008	14	14	28
3	Coal mining.	1	1	4	11	15	520	12	532
4	Dry goods.	1	1	13	1	14	5	1	6
5	Electric power station.	1	1	9	9	18	18	1	19
6	Glove manufactories.	2	1	9	9	18	1	1	2
7	Hardware and plumbing.	2	1	9	9	18	9	1	10

STATUTORY INVESTIGATION—PART II—CONTINUED.
BLACK HAWK COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
17	Mattress and furniture manufactory	1,629	377	2,006	3,272	1,115	4,387	..	..	27	3.00
18	Merchant tailoring	38,000	1,100	39,100	39,422	1,082	40,504	..	..	..	..
19	Milling, flour and grain	25,951	3,080	29,031	32,658	2,836	35,494	..	..	86	10.00
20	Newspapers, printing and publishing	11,921	812	12,733	14,500	500	15,000	..	..	..	..
21	Pork packing	53,324	867	54,191	89,226	312	89,538	9	10.00	..	..
22	Refrig'rs, bank & store hardw'd fixture, mfg	1,500	..	1,500	1,900	..	1,900	100	10.00	..	..
23	Sorghum manufactory	35,000	9,000	44,000	10,800	4,080	14,880	..	..	12	20.00
24	Telephone line and exchanges, local	..	..	..	1,700	80	1,780	..	..	..	..
25	Wholesale drugs	..	..	..	8,500	..	8,500	..	..	..	..
26	Wholesale fruits and commission	..	..	..	37,788	2,518	40,306	..	..	..	..
27	Wholesale groceries	74,621	1,390	76,011	..	..	..	..	..	..	..
	Total	\$ 340,759	\$ 42,679	\$ 399,421	\$ 391,270	\$ 48,007	\$ 445,781	..	..	..	..

a Average. *b* Board and room included. *c* Separate accounts for males and females not reported. *d* One establishment only.
CAUSE OF INCREASE OR REDUCTION: *1* General advance in wages. *2* General prosperity. *3* Demand for labor. *4* Good help scarce. *5* Efficiency. *6* By order of state insurance department. *7* Scarcity of skilled labor. *8* General advance in wages. *9* General advance of wages. *10* Demand by workmen.
11 General prosperity. *12* Higher prices in all lines. *13* Faithfulness.
NUMBER WEEKS OPERATED: * 35 full, 17 short; † 37 full, 15 short; ‡ 47 full, 5 short; § 26 full, 26 short; || 40 full, 12 short; ¶ 36 full, 16 short; ** 40 full, 12 short; †† 29 full, 23 short.

BOONE COUNTY.

1	Blank book manufactory	\$ 5,000	..	..	\$ 4,723	\$ 959	\$ 5,682	..	..	..	..
2	Brick and tile manufactories	171,288	..	..	4,500	..	4,500	..	..	9	10.00
3	Coal mining	..	..	..	171,288	175,622	175,622	..	..	..	..
4	Dry goods	2,220	3,000	5,220	2,640	3,075	5,715	..	..	..	..
5	Electric power station	7,800	156	7,956	10,320	240	10,560	..	..	..	..
6	Glove manufactories	3,200	2,000	5,200	..	..	..	..	..	..	..
7	Hardware and plumbing	..	..	..	5,830	300	6,130	..	..	..	..

STATUTORY INVESTIGATION—PART I—CONTINUED.
BOONE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.									
		Number establishments reporting.		1899.				1900.			
				Males.	Females.	Total.	Males.	Females.	Total.		
		1899	1900								
8	Hotel.....	2	3	12	18	30	19	24	43		
9	Laundry, steam.....	1	1	4	10	14	4	13	17		
10	Merchant tailoring.....	1	1	10	10	10	6	2	8		
11	Merchant millinery.....	1	1	12	12	12	11	.....	11		
12	Newspaper, printing and publishing.....	n	2	.....	.....	.....	8	10	18		
13	Saddlery manufactory.....	1	n	35	1	36	..	.....	.....
	Total.....	16	17	623	50	673	621	68	689		
	n Not reported.										

BREMER COUNTY.

1	Bakery and restaurant.....	1	1	2	6	8	.....	.....	.....
2	Creamery supplies.....	1	1	14	.....	14	16	.....	16
3	Furniture manufactory and job work.....	1	1	.....	.....	.....	8	.....	8
4	Brick and tile manufactory.....	1	1	.....	.....	.....	12	.....	12
	Total.....	2	3	16	6	22	36	.....	36
n	Not reported.								

BUCHANAN COUNTY.

1	Cold storage and egg packing.....	1	1	35	.....	35	10	.....	10
2	Hotels and restaurants.....	2	2	9	16	25	8	17	25
3	Milling and grain.....	1	1	9	1	10	7	1	8
4	Planing mill, sash doors, etc.....	1	1	16	1	17	10	1	17

STATUTORY INVESTIGATION—PART II—CONTINUED.
HOONE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
8	Hotel.....	2,470	2,000	4,470	4,548	4,428	8,976	55.00			
9	Laundry, steam.....	1,446	2,137	3,583	1,506	2,834	4,340	65.00			
10	Merchant tailoring.....	4,262		4,262	4,161		4,161	7.5			
11	Merchant millinery.....	6,999		6,999	7,900		7,900	12.5			
12	Newspaper, printing and publishing.....				3,230	1,948	5,178	107.5			
13	Saddlery manufactory.....	20,361	360	20,720							
	Total.....	\$221,976	\$ 9,653	\$231,629	\$24,963	\$ 14,281	\$39,247				

a Average. b Includes board and room. CAUSE OF INCREASE OR REDUCTION: 1 Demanded by labor, 2 Labor organized, 3 Prosperity, 4 Plenty business, 5 Prosperity, we suppose, 6 More work to do, 7 Better times, 8 Increased cost of living, 9 Proficiency, 10 Increased efficiency.

BREMER COUNTY.

1	Bakery and restaurant.....	c		b \$1,400				52			
2	Creamery supplies.....	\$ 4,500		4,500	\$ 3,200		\$ 3,200	40	40		
3	Furniture manufactory and job work.....				1,920		1,920		*	40	
4	Brick and tile manufactory.....				1,400		1,400		20		
	Total.....	\$ 4,500		\$ 5,900	\$ 6,520		\$ 6,520				

b Includes board and room. c Separate accounts for males and females not reported. NUMBER WEEKS OPERATED: * 35 full, 4 short.

BUCHANAN COUNTY.

1	Cold storage and egg packing.....	\$ 5,281		\$ 5,281	\$ 4,120		\$ 4,120	52			
2	Hotels and restaurants.....	b 2,710		b 2,710	b 2,800		b 2,800	52			
3	Milling and grain.....	5,200		5,200	4,470		4,470	52			
4	Planing mill, sash doors, etc.....	5,290	404	5,700	5,788	404	6,254	52			

STATUTORY INVESTIGATION—PART I—CONTINUED.
BUCHANAN COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establish-ments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
5	Transfer and transportation.....	1	1	6	.....	6	.....	6	
6	Wholesale groceries.....	1	1	9	1	10	9	10	
	Total	7	7	84	19	103	62	82	

BUENA VISTA COUNTY.

1	Brick and tile works.....	1	1	.....	.....	4	.....
2	General Merchandise.....	1	2	7	1	12	3
	Total.....	1	3	7	1	16	3

CARROLL COUNTY.

1	Hotels.....	2	3	11	17	19	28
2	Newspaper, printing, etc ..	1	1	1	.....	1	.....
3	Wholesale groceries ..	1	n	9	1	10	.....
	Total.....	4	4	21	18	20	28

n Not reported.

BUCHANAN COUNTY--CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING	
		1899.		1900.		1899.	1900.	1899.	1900.
		Males.	Females.	Total.	Males.	Females.	Total.	Increase (per cent.)	Reduction (per cent.)
5	Transfer and transportation	2 687	.....	2 687	2 500	....	2 500	.....	.....
6	Wholesale groceries.....	6,000	480	6,480	6,000	300	6,300	.....	.....
	Total	\$ 27,174	\$ 4,224	\$ 31,398	\$ 25,628	\$ 4,097	\$ 29,725	.....	.....

Includes board and room. CAUSE OF INCREASE OR REDUCTION: / Efficiency. NUMBER WEEKS OPERATED: * 16 full, 32 short.

BUENA VISTA COUNTY.

1	Brick and tile works .....	.....	.....	.....	\$ 650	.....	\$ 650	.....	.....
2	General merchandise.	\$ 3,380	\$ 285	\$ 3,665	\$ 5,850	\$ 1,040	\$ 6,890	.....	.....
	Total	\$ 3,380	\$ 285	\$ 3,665	\$ 6,500	\$ 1,040	\$ 7,540	.....	.....

CARROLL COUNTY.

1	Hotels.....	\$ 2,431	\$ 2,740	\$ 5,171	\$ 4,368	\$ 5,140	\$ 9,508	.....	.....
2	Newspaper, printing, etc.	520	...	520	300	...	300	.....	.....
3	Wholesale groceries.....	11,000	350	11,350	....	.....	....	.....	.....
	Total	\$ 13,951	\$ 3,090	\$ 17,041	\$ 4,728	\$ 5,140	\$ 9,868	.....	.....

Includes board and room.

STATUTORY INVESTIGATION—PART I—CONTINUED.

CASS COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Brick and tile works.....	11	1	200	100	300	7	150	157
2	Canning factories.....	1	1	7	2	9	.....	.....	.....
3	Clothing, retail.....	1	11	.....	.....	.....	.....	.....	.....
4	Dry goods, retail and groceries.....	1	11	6	5	11	.....	.....	.....
5	General merchandise.....	1	2	6	2	8	.....	.....	.....
6	Hotel.....	1	1	2	5	7	.....	.....	.....
7	Laundry, steam.....	11	1	.....	.....	.....	.....	.....	.....
8	Planing mill, broom manufacturing and contracting.....	11	1	.....	.....	.....	.....	.....	.....
9	Printing, binding, publishing.....	2	2	9	1	10	.....	.....	.....
	Total.....	7	9	231	115	347	268	172	440

n. Not reported.

CEDAR COUNTY.

[illegible]

CERRO GORDO COUNTY.

[illegible]

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				AVERAGE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	Increase (per cent.)	Reduction (per cent.)
1	Brick and tile works	\$ 15,000	\$ 5,000	\$ 20,000	\$ 900	\$ 2,500	\$ 3,400	17	..
2	Canning factories	3,800	470	4,270	5,500	8,000	13,500	48	7 20.00
3	Clothing, retail, and groceries	2,912	1,341	4,253	..	..	..	52	..
4	Dry goods, retail, and groceries	2,460	420	2,880	5,263	1,587	6,850	52	..
5	General merchandise	6 516	6 360	6 876	6 1,084	6 1,908	6 2,992	52	2 3.00
6	Hotel	..	..	..	2,000	500	2,500	52	..
7	Laundry, steam	..	..	..	6,735	7,785	14,520	452	3 20.00
8	Planing mill, broom Mfg. and contracting	7,500	300	7,800	8,182	8,182	16,364	52	..
9	Printing, binding, publishing	..	..	..	..	..	..	..	..
	Total	\$ 32,188	\$ 7,894	\$ 40,082	\$ 30,664	\$ 5,471	\$ 36,135	..	..

CAUSE OF INCREASE OR REDUCTION: 1 Scarcity of help. 2 Competency. 3 More business. 4 Better times. NUMBER WEEKS OPERATED: * 12 full, 36 short. † 10 full, 36 short. ‡ 36 full, 16 short.

CEDAR COUNTY.

1	Brick and tile works	\$ 2,200	..	\$ 2,200	\$ 2,226	..	\$ 2,226	32	..
2	Lime manufacturing	3,800	..	3,800	..	..	..	40	..
	Total	\$ 6,000	..	\$ 6,000	\$ 2,226	..	\$ 2,226	..	..

CERRO GORDO COUNTY.

1	Brick and tile works	\$ 32,051	..	\$ 32,051	\$ 42,589	..	\$ 42,589	† 50	..
2	Cold storage and packing	6,077	..	6,077	5,500	..	5,500	52	..
3	Contracting and building	..	..	..	11,400	..	11,400	52	..

STATUTORY INVESTIGATION—PART. I—CONTINUED.

CERRO GORDO COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number estab- lish- ments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
			1899.		1900.	
			1899	Total.	Males.	Females.
4	Dry goods, general merchandise	2	2	20	7	20
5	Electric power	1	17	17	11	21
6	Hotel	3	11	39	23	32
7	Laundry and dyeing	2	18	29	20	51
8	Printing and publishing	2	13	9	16	10
9	Sash, doors and interior fixture manufactory	1	1	26	26	26
10	Wholesale grocers	1	24	28	27	30
	Total	14	102	228	234	317

a Better times.

CHEROKEE COUNTY.

1	Brick and tile works	1	1	20	20	20
2	Hotel	2	n	4	12	10
	Total	3	1	24	12	36

n. Not reported.

CHICKASAW COUNTY.

1	Brick and tile works	1	1	8	8	8
2	Newspapers, printing and job work	n	1	1	2	3
3	Tow manufactory (flax)	n	1	1	10	10
	Total	1	3	8	20	23

n. Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		1899.		1900.		INCREASE OR DECREASE IN DAILY WAGES DURING YEAR.	
		1899.		1900.		1899.	1900.	In-crease (per cent.)	Reduc-tion (per cent.)	1899.	1900.	In-crease (per cent.)	Reduc-tion (per cent.)
		Males.	Females.	Total.	Males.	Females.	Total.						
4	Dry goods, general merchandise.....	4,677	3,900	8,577	3,596	6,368	9,964	52	52	52	52	.....	.....
5	Electric power.....	7,440	.....	7,440	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Hotel.....	3,626	5,762	9,388	6,306	3,410	6,466	52	52	52	52	.....	.....
7	Laundry and dyeing.....	7,722	6,417	14,139	11,548	6,088	17,716	52	52	52	52	2 10.00	.....
8	Printing and publishing.....	6,240	3,452	9,492	4,440	1,536	5,976	52	52	52	52	3 15.00	.....
9	Sash door and interior fixture manufactory..	.....	.....	.....	12,620	.....	.....	52	52	52	52	.....	.....
10	Wholesale grocers.....	24,900	2,400	25,300	20,000	2,500	22,500	52	52	52	52	.....	.....
	Total.....	\$ 92,733	\$ 21,731	\$ 112,464	\$ 114,749	\$ 19,082	\$ 134,731	.....	.....	.....	.....	.....	.....

NUMBER WORKERS OPERATED: * 40 full, 12 short. † 27 full, 23 short. ‡ 40 full, 12 short. CAUSE OF INCREASE OR REDUCTION: † Increased demand for help and increase in cost of living. ‡ Efficiency and demand. § More and better work. ¶ Earnings increased. § Skilled labor.

CHEROKEE COUNTY.

1	Brick and tile works.....	\$ 4,185	\$ 4,185	\$ 3,500	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Hotel.....	864	2,516	3,380	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Total.....	\$ 5,049	\$ 2,516	\$ 7,565	\$ 3,500	.....	\$ 3,500	.....	.....	.....	.....	.....	.....

CAUSE OF INCREASE OR REDUCTION: † Mistaken prosperity. ‡ Includes board and room.

CHICKASAW COUNTY.

1	Brick and tile works.....	\$ 1,600	.....	\$ 1,600	\$ 800	.....	.....	.....	.....	.....	.....	.....	.....
2	Newspaper, printing and job work.....	.....	.....	.....	2,000	300	2,300	.....	.....	.....	.....	.....	.....
3	Tow manufacturing (flax).....	.....	.....	.....	2,910	.....	2,910	.....	.....	.....	.....	.....	.....
	Total.....	\$ 1,600	.....	\$ 1,600	\$ 5,710	\$ 300	\$ 6,010	.....	.....	.....	.....	.....	.....

CAUSE OF INCREASE OR REDUCTION: † Apprentices out of time.

STATUTORY INVESTIGATION—PART I—CONTINUED
CLARKE COUNTY.

Marginal number,	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
			1899.		1900.			
			1899	1900	Males.	Females.	Total.	
1	Hotel.	1	1	4	5	9	5	9
	Total	1	1	4	5	9	5	9

CLAY COUNTY.

1	Grain, hay and live stock.	1	1	32	.....	32	30	1	31
2	Hotel.	1	1	4	12	10	4	10	14
	Total	2	2	36	12	48	34	11	45

CLAYTON COUNTY.

1	Brick and tile works	1	1	8	.....	8	14	.....	14
2	Bookbinding and printing	1	1	3	3	6	2	3	5
3	Lumber and planing mill	2	2	130	.....	130	86	1	87
4	Pearl button works	"	1	1	.....	.....	50	.....	50
	Total	4	5	141	3	144	152	4	156

" Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING				
		1899.			1900.	1899.	1900.	1899.				
		Males.	Females.	Total.	Males.			Females.	Total.	In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)
1	Hotel.....	\$ 1,208	\$ 746	\$ 1,954	\$ 1,208	\$ 746	\$ 1,954	52	52	.....	.....	.....
	Total.....	\$ 1,208	\$ 746	\$ 1,954	\$ 1,208	\$ 746	\$ 1,954	.....	.....	.....	.....	.....
	/ Includes board and room.											

CLAY COUNTY.

1	Grain, hay and live stock.....	\$ 15,285	.....	\$ 15,285	.....	.....	.....	.....	.....	.....
2	Hotel.....	\$ 768	\$ 1,820	\$ 2,588	52	52	.....	.....	.....	.....
	Total.....	\$ 16,053	\$ 1,820	\$ 17,873	52	52	.....	.....	.....	.....
	Includes board and room.									

CLAYTON COUNTY.

1	Brick and tile works.....	\$ 1,783	.....	\$ 1,783	.....	.....	.....	.....	.....	.....
2	Bookbinding and printing.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Lumber and planing mill.....	33,861	40,134	33,861	52	52	.....	.....	.....	.....
4	Pearl button works.....	.....	7,118	.....	.....	.....	.....	.....	.....	.....
	Total.....	\$ 35,644	\$ 51,069	\$ 37,644	52	52	.....	.....	.....	.....
	Includes board and room.									

CAUSE OF INCREASE OR REDUCTION: / Increased demand for la bor. 2 Scarcity of labor.

STATUTORY INVESTIGATION—PART I—CONTINUED.
CLINTON COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number of establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899	1900	1899		1900.			
				Males.	Females.	Total.	Males.	Females.	Total.
1	Bed spring manufacturing	1	n	24	1	25	...	...	...
2	Brick and tile work	1	1	25	...	25	30	...	30
3	Balers, tanks and sheet metal work	1	1	16	...	16	20	...	20
4	Box, crate and shuck manufactory	2	2	116	...	116	105	...	105
5	Candy manufactory	1	1	3	3	6	4	3	7
6	Clothing, retail	3	3	21	2	23	22	2	24
7	Cracker and cake manufactory	1	1	18	...	18	20	...	20
8	Dry goods and general merchandise	4	4	48	48	96	55	63	118
9	Electric power, light and transportation	2	2	49	1	50	49	...	49
10	Engineering works, civil	1	1	11	1	12	7	2	9
11	Furniture manufactory	1	1	137	9	146	141	5	146
12	Hotel	3	3	18	35	53	13	23	36
13	Laundry, steam	3	3	5	20	25	5	25	30
14	Lumber and lath manufactory	3	3	866	3	869	841	...	841
15	Machine shops and foundries	2	2	18	...	18	22	...	22
16	Machine and structural iron works	1	1	152	...	152	155	1	156
17	Malt and brewing	1	1	12	...	12	10	...	10
18	Milling and grail	2	2	12	1	13	13	...	13
19	Millinery	1	1	...	6	6	...	5	5
20	Packers of meats	1	n	131	...	131	...	...	...
21	Paper box and wooden ware manufactory	1	1	15	3	18	19	3	22
22	Printing, publishing and binding	3	3	60	16	76	62	11	73
23	Sash, door and blind manufactory	2	2	485	1	486	415	...	415
24	Saddlery and neck yokes manufactory	1	n	35	...	35	...	...	...
25	Telephone exchange (local)	1	1	...	...	...	...	...	...
26	Wagon manufactory	n	1	125	...	125	100	6	106
27	Water supply	1	1	7	...	7	7	...	7
28	Wholesale crockery and glassware	1	1	10	3	13	...	...	...
29	Wholesale drugs	1	1	27	...	27	27	...	27
30	Wholesale fruits and produce	1	1	4	1	5	5	1	6

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1899.				1900.				number of weeks in operation.		1899.		1900.		In-crease (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)		
		Males		Females.		Total.		Males.		Females.		Total.		1899.					1900.	
		1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.	1899.	1900.					
1	Bed spring manufacturing.....	\$ 5,795	\$ 265		\$ 6,060		5,400		\$ 5,400	48			23		15.00					
2	Brick and tile works.....	7,500			7,500		7,473		7,473	28			23		10.00					
3	Boilers, tanks and sheet metal work.....	5,000			5,000		34,538		34,538	52			52		10.00					
4	Box, crate and shuck manufactory.....	37,585			37,585		468		468	52			52		7.25					
5	Candy manufactory.....	10,304	\$ 480		\$ 1,100		10,800		11,100	52			52		7.25					
6	Clothing, retail.....	14,507	3,093		17,600		14,685		15,085	52			52		7.25					
7	Cracker and cake manufactory.....	28,174	13,076		41,250		29,700		31,630	52			52		7.25					
8	Dry goods and general merchandise.....	28,457	510		28,967		31,630		31,630	52			52		7.25					
9	Electric power, light and transportation.....	4,100	300		4,400		3,480		3,960	52			52		20.00					
10	Engineering works, civil.....	38,040	2,430		40,470		37,805		39,255	52			52		20.00					
11	Furniture manufactory.....	6,524	6		6,530		6,396		6,396	52			52		7.25					
12	Hotel.....	2,600	1,310		3,910		273,156		273,156	852			852		5.75					
13	Laundry, steam.....	272,313			273,023		9,800		9,800	52			52		12.00					
14	Lumber and lath manufactory.....	8,700			8,700		42,579		42,579	52			52		7.50					
15	Machine shops and foundries.....	41,945			41,945		8,209		8,209	52			52		12.5					
16	Machine and structural iron works.....	7,496			7,496		6,640		6,640	52			52		7.25					
17	Malt and brewing.....	6,600	300		6,900		1,000		1,000	52			52		7.25					
18	Milling and grain.....	1,400			1,400		7,600		7,600	52			52		7.25					
19	Millinery.....	20,270	480		20,750		31,084		35,817	52			52		17.50					
20	Packers of meats.....	6,520	6,761		13,281		109,600		109,600	8852			8852		10.00					
21	Paper box and wooden ware manufactory.....	17,086	455		17,541		3,000		3,000	52			52		10.00					
22	Printing, publishing and binding.....	157,834			157,834		39,386		39,386	47			47		12.5					
23	Sash, door and blind manufactory.....	12,719			12,719		4,986		4,986	52			52		7.25					
24	Saddlery and neck yokes manufactory.....						34,495		34,495	52			52		7.25					
25	Saddlery and neck yokes manufactory (local).....	43,782			43,782		2,075		2,075	52			52		7.25					
26	Telephone exchange (local).....	4,920	570		5,490		11,541		11,541	52			52		7.25					
27	Wagon manufactory.....	4,920			4,920		34,495		34,495	52			52		7.25					
28	Water supply.....	5,000			5,000		2,075		2,075	52			52		7.25					
29	Wholesale crockery and glassware.....	39,100			39,100		11,541		11,541	52			52		7.25					
30	Wholesale drugs.....	2,601			2,601					52			52		7.25					
31	Wholesale fruits and produce.....	11,237			11,237					52			52		7.25					
32	Wholesale groceries.....									52			52		7.25					

STATUTORY INVESTIGATION—PART I—CONTINUED.
CLINTON COUNTY--CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.		1900.			
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
32	Wholesale and retail hardware.....	2	2	24	3	27	23	3	26
33	Wood, coal and building material.....	n	2	.....	.....	.....	18	1	19
	Total.....	50	48	2,512	171	2,683	2,199	172	2,371
	a Average. n Not reported.								

CRAWFORD COUNTY.

1	Brick and tile works.....	1	1	13	.....	13	.....	.....	13
2	Hotel.....	1	1	2	9	11	7	2	9
	Total.....	2	2	15	9	24	20	2	22

DALLAS COUNTY.

1	Brick and tile works.....	3	2	50	.....	50	41	.....	41
2	Coal mining.....	2	1	44	.....	44	22	.....	22

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.	INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.			1899.	1900.		
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	
32	Wholesale and retail hardware.	14,000	1,140	15,140	12,666	1,118	13,774	52	52	
33	Wood, coal and building material.	.....	.....	.....	7,155	420	7,573	52	52
	Total	\$ 856,396	\$ 44,979	\$ 901,248	\$ 841,711	\$ 35,660	\$ 887,371	.....	.....
	<i>a</i> Average. <i>b</i> Includes board and room. <i>c</i> Separate accounts for males and females not reported. <i>d</i> One establishment. CAUSE OF INCREASE OR REDUCTION: <i>1</i> Better demand for labor and product. <i>2</i> Better business, scarcity of help. <i>3</i> Trifling increase in business. <i>4</i> Better demand. <i>5</i> Better prices and demand. <i>6</i> Better business. <i>7</i> Hard to get material. <i>8</i> More business. <i>9</i> Increased business. <i>10</i> Other concerns. increased wages. <i>11</i> Efficiency. <i>12</i> In one house greater proficiency. <i>13</i> Prosperity and demand by labor. <i>14</i> Increased demand. <i>15</i> Reduction in business. NUMBER WEEKS OPERATED: <i>a</i> 9 full, 17 short. <i>b</i> 20 full, 20 short. <i>c</i> 22 full, 20 short. <i>d</i> 36 full, 20 short. <i>e</i> 40 full, 12 short. <i>f</i> 30 full, 20 short. <i>g</i> 24 full, 28 short. <i>h</i> 24 full, 28 short. <i>i</i> 24 full, 28 short. <i>j</i> 24 full, 28 short. <i>k</i> 24 full, 28 short. <i>l</i> 24 full, 28 short. <i>m</i> 24 full, 28 short. <i>n</i> 24 full, 28 short. <i>o</i> 24 full, 28 short. <i>p</i> 24 full, 28 short. <i>q</i> 24 full, 28 short. <i>r</i> 24 full, 28 short. <i>s</i> 24 full, 28 short. <i>t</i> 24 full, 28 short. <i>u</i> 24 full, 28 short. <i>v</i> 24 full, 28 short. <i>w</i> 24 full, 28 short. <i>x</i> 24 full, 28 short. <i>y</i> 24 full, 28 short. <i>z</i> 24 full, 28 short. <i>aa</i> 24 full, 28 short. <i>ab</i> 24 full, 28 short. <i>ac</i> 24 full, 28 short. <i>ad</i> 24 full, 28 short. <i>ae</i> 24 full, 28 short. <i>af</i> 24 full, 28 short. <i>ag</i> 24 full, 28 short. <i>ah</i> 24 full, 28 short. <i>ai</i> 24 full, 28 short. <i>aj</i> 24 full, 28 short. <i>ak</i> 24 full, 28 short. <i>al</i> 24 full, 28 short. <i>am</i> 24 full, 28 short. <i>an</i> 24 full, 28 short. <i>ao</i> 24 full, 28 short. <i>ap</i> 24 full, 28 short. <i>aq</i> 24 full, 28 short. <i>ar</i> 24 full, 28 short. <i>as</i> 24 full, 28 short. <i>at</i> 24 full, 28 short. <i>au</i> 24 full, 28 short. <i>av</i> 24 full, 28 short. <i>aw</i> 24 full, 28 short. <i>ax</i> 24 full, 28 short. <i>ay</i> 24 full, 28 short. <i>az</i> 24 full, 28 short. <i>ba</i> 24 full, 28 short. <i>bb</i> 24 full, 28 short. <i>bc</i> 24 full, 28 short. <i>bd</i> 24 full, 28 short. <i>be</i> 24 full, 28 short. <i>bf</i> 24 full, 28 short. <i>bg</i> 24 full, 28 short. <i>bh</i> 24 full, 28 short. <i>bi</i> 24 full, 28 short. <i>bj</i> 24 full, 28 short. <i>bk</i> 24 full, 28 short. <i>bl</i> 24 full, 28 short. <i>bm</i> 24 full, 28 short. <i>bn</i> 24 full, 28 short. <i>bo</i> 24 full, 28 short. <i>bp</i> 24 full, 28 short. <i>bq</i> 24 full, 28 short. <i>br</i> 24 full, 28 short. <i>bs</i> 24 full, 28 short. <i>bt</i> 24 full, 28 short. <i>bu</i> 24 full, 28 short. <i>bv</i> 24 full, 28 short. <i>bw</i> 24 full, 28 short. <i>bx</i> 24 full, 28 short. <i>by</i> 24 full, 28 short. <i>bz</i> 24 full, 28 short. <i>ca</i> 24 full, 28 short. <i>cb</i> 24 full, 28 short. <i>cc</i> 24 full, 28 short. <i>cd</i> 24 full, 28 short. <i>ce</i> 24 full, 28 short. <i>cf</i> 24 full, 28 short. <i>cg</i> 24 full, 28 short. <i>ch</i> 24 full, 28 short. <i>ci</i> 24 full, 28 short. <i>cj</i> 24 full, 28 short. <i>ck</i> 24 full, 28 short. <i>cl</i> 24 full, 28 short. <i>cm</i> 24 full, 28 short. <i>cn</i> 24 full, 28 short. <i>co</i> 24 full, 28 short. <i>cp</i> 24 full, 28 short. <i>cq</i> 24 full, 28 short. <i>cr</i> 24 full, 28 short. <i>cs</i> 24 full, 28 short. <i>ct</i> 24 full, 28 short. <i>cu</i> 24 full, 28 short. <i>cv</i> 24 full, 28 short. <i>cw</i> 24 full, 28 short. <i>cx</i> 24 full, 28 short. <i>cy</i> 24 full, 28 short. <i>cz</i> 24 full, 28 short. <i>da</i> 24 full, 28 short. <i>db</i> 24 full, 28 short. <i>dc</i> 24 full, 28 short. <i>dd</i> 24 full, 28 short. <i>de</i> 24 full, 28 short. <i>df</i> 24 full, 28 short. <i>dg</i> 24 full, 28 short. <i>dh</i> 24 full, 28 short. <i>di</i> 24 full, 28 short. <i>dj</i> 24 full, 28 short. <i>dk</i> 24 full, 28 short. <i>dl</i> 24 full, 28 short. <i>dm</i> 24 full, 28 short. <i>dn</i> 24 full, 28 short. <i>do</i> 24 full, 28 short. <i>dp</i> 24 full, 28 short. <i>dq</i> 24 full, 28 short. <i>dr</i> 24 full, 28 short. <i>ds</i> 24 full, 28 short. <i>dt</i> 24 full, 28 short. <i>du</i> 24 full, 28 short. <i>dv</i> 24 full, 28 short. <i>dw</i> 24 full, 28 short. <i>dx</i> 24 full, 28 short. <i>dy</i> 24 full, 28 short. <i>dz</i> 24 full, 28 short. <i>ea</i> 24 full, 28 short. <i>eb</i> 24 full, 28 short. <i>ec</i> 24 full, 28 short. <i>ed</i> 24 full, 28 short. <i>ee</i> 24 full, 28 short. <i>ef</i> 24 full, 28 short. <i>eg</i> 24 full, 28 short. <i>eh</i> 24 full, 28 short. <i>ei</i> 24 full, 28 short. <i>ej</i> 24 full, 28 short. <i>ek</i> 24 full, 28 short. <i>el</i> 24 full, 28 short. <i>em</i> 24 full, 28 short. <i>en</i> 24 full, 28 short. <i>eo</i> 24 full, 28 short. <i>ep</i> 24 full, 28 short. <i>eq</i> 24 full, 28 short. <i>er</i> 24 full, 28 short. <i>es</i> 24 full, 28 short. <i>et</i> 24 full, 28 short. <i>eu</i> 24 full, 28 short. <i>ev</i> 24 full, 28 short. <i>ew</i> 24 full, 28 short. <i>ex</i> 24 full, 28 short. <i>ey</i> 24 full, 28 short. <i>ez</i> 24 full, 28 short. <i>fa</i> 24 full, 28 short. <i>fb</i> 24 full, 28 short. <i>fc</i> 24 full, 28 short. <i>fd</i> 24 full, 28 short. <i>fe</i> 24 full, 28 short. <i>ff</i> 24 full, 28 short. <i>fg</i> 24 full, 28 short. <i>fh</i> 24 full, 28 short. <i>fi</i> 24 full, 28 short. <i>fj</i> 24 full, 28 short. <i>fk</i> 24 full, 28 short. <i>fl</i> 24 full, 28 short. <i>fm</i> 24 full, 28 short. <i>fn</i> 24 full, 28 short. <i>fo</i> 24 full, 28 short. <i>fp</i> 24 full, 28 short. <i>fq</i> 24 full, 28 short. <i>fr</i> 24 full, 28 short. <i>fs</i> 24 full, 28 short. <i>ft</i> 24 full, 28 short. <i>fu</i> 24 full, 28 short. <i>fv</i> 24 full, 28 short. <i>fw</i> 24 full, 28 short. <i>fx</i> 24 full, 28 short. <i>fy</i> 24 full, 28 short. <i>fz</i> 24 full, 28 short. <i>ga</i> 24 full, 28 short. <i>gb</i> 24 full, 28 short. <i>gc</i> 24 full, 28 short. <i>gd</i> 24 full, 28 short. <i>ge</i> 24 full, 28 short. <i>gf</i> 24 full, 28 short. <i>gg</i> 24 full, 28 short. <i>gh</i> 24 full, 28 short. <i>gi</i> 24 full, 28 short. <i>gj</i> 24 full, 28 short. <i>gk</i> 24 full, 28 short. <i>gl</i> 24 full, 28 short. <i>gm</i> 24 full, 28 short. <i>gn</i> 24 full, 28 short. <i>go</i> 24 full, 28 short. <i>gp</i> 24 full, 28 short. <i>gq</i> 24 full, 28 short. <i>gr</i> 24 full, 28 short. <i>gs</i> 24 full, 28 short. <i>gt</i> 24 full, 28 short. <i>gu</i> 24 full, 28 short. <i>gv</i> 24 full, 28 short. <i>gw</i> 24 full, 28 short. <i>gx</i> 24 full, 28 short. <i>gy</i> 24 full, 28 short. <i>gz</i> 24 full, 28 short. <i>ha</i> 24 full, 28 short. <i>hb</i> 24 full, 28 short. <i>hc</i> 24 full, 28 short. <i>hd</i> 24 full, 28 short. <i>he</i> 24 full, 28 short. <i>hf</i> 24 full, 28 short. <i>hg</i> 24 full, 28 short. <i>hi</i> 24 full, 28 short. <i>hj</i> 24 full, 28 short. <i>hk</i> 24 full, 28 short. <i>hl</i> 24 full, 28 short. <i>hm</i> 24 full, 28 short. <i>hn</i> 24 full, 28 short. <i>ho</i> 24 full, 28 short. <i>hp</i> 24 full, 28 short. <i>hq</i> 24 full, 28 short. <i>hr</i> 24 full, 28 short. <i>hs</i> 24 full, 28 short. <i>ht</i> 24 full, 28 short. <i>hu</i> 24 full, 28 short. <i>hv</i> 24 full, 28 short. <i>hw</i> 24 full, 28 short. <i>hx</i> 24 full, 28 short. <i>hy</i> 24 full, 28 short. <i>hz</i> 24 full, 28 short. <i>ia</i> 24 full, 28 short. <i>ib</i> 24 full, 28 short. <i>ic</i> 24 full, 28 short. <i>id</i> 24 full, 28 short. <i>ie</i> 24 full, 28 short. <i>if</i> 24 full, 28 short. <i>ig</i> 24 full, 28 short. <i>ih</i> 24 full, 28 short. <i>ii</i> 24 full, 28 short. <i>ij</i> 24 full, 28 short. <i>ik</i> 24 full, 28 short. <i>il</i> 24 full, 28 short. <i>im</i> 24 full, 28 short. <i>in</i> 24 full, 28 short. <i>io</i> 24 full, 28 short. <i>ip</i> 24 full, 28 short. <i>iq</i> 24 full, 28 short. <i>ir</i> 24 full, 28 short. <i>is</i> 24 full, 28 short. <i>it</i> 24 full, 28 short. <i>iu</i> 24 full, 28 short. <i>iv</i> 24 full, 28 short. <i>iw</i> 24 full, 28 short. <i>ix</i> 24 full, 28 short. <i>iy</i> 24 full, 28 short. <i>iz</i> 24 full, 28 short. <i>ja</i> 24 full, 28 short. <i>jb</i> 24 full, 28 short. <i>jc</i> 24 full, 28 short. <i>jd</i> 24 full, 28 short. <i>je</i> 24 full, 28 short. <i>jf</i> 24 full, 28 short. <i>jj</i> 24 full, 28 short. <i>jk</i> 24 full, 28 short. <i>jl</i> 24 full, 28 short. <i>jm</i> 24 full, 28 short. <i>jn</i> 24 full, 28 short. <i>jo</i> 24 full, 28 short. <i>jp</i> 24 full, 28 short. <i>jq</i> 24 full, 28 short. <i>jr</i> 24 full, 28 short. <i>js</i> 24 full, 28 short. <i>jt</i> 24 full, 28 short. <i>ju</i> 24 full, 28 short. <i>jv</i> 24 full, 28 short. <i>jw</i> 24 full, 28 short. <i>jx</i> 24 full, 28 short. <i>gy</i> 24 full, 28 short. <i>jz</i> 24 full, 28 short. <i>ka</i> 24 full, 28 short. <i>kb</i> 24 full, 28 short. <i>kc</i> 24 full, 28 short. <i>kd</i> 24 full, 28 short. <i>ke</i> 24 full, 28 short. <i>kf</i> 24 full, 28 short. <i>kg</i> 24 full, 28 short. <i>kh</i> 24 full, 28 short. <i>ki</i> 24 full, 28 short. <i>kj</i> 24 full, 28 short. <i>kl</i> 24 full, 28 short. <i>km</i> 24 full, 28 short. <i>kn</i> 24 full, 28 short. <i>ko</i> 24 full, 28 short. <i>kp</i> 24 full, 28 short. <i>kq</i> 24 full, 28 short. <i>kr</i> 24 full, 28 short. <i>ks</i> 24 full, 28 short. <i>kt</i> 24 full, 28 short. <i>ku</i> 24 full, 28 short. <i>kv</i> 24 full, 28 short. <i>kw</i> 24 full, 28 short. <i>kx</i> 24 full, 28 short. <i>ky</i> 24 full, 28 short. <i>kz</i> 24 full, 28 short. <i>la</i> 24 full, 28 short. <i>lb</i> 24 full, 28 short. <i>lc</i> 24 full, 28 short. <i>ld</i> 24 full, 28 short. <i>le</i> 24 full, 28 short. <i>lf</i> 24 full, 28 short. <i>lg</i> 24 full, 28 short. <i>lh</i> 24 full, 28 short. <i>li</i> 24 full, 28 short. <i>lj</i> 24 full, 28 short. <i>lk</i> 24 full, 28 short. <i>ll</i> 24 full, 28 short. <i>lm</i> 24 full, 28 short. <i>ln</i> 24 full, 28 short. <i>lo</i> 24 full, 28 short. <i>lp</i> 24 full, 28 short. <i>lq</i> 24 full, 28 short. <i>lr</i> 24 full, 28 short. <i>ls</i> 24 full, 28 short. <i>lt</i> 24 full, 28 short. <i>lu</i> 24 full, 28 short. <i>lv</i> 24 full, 28 short. <i>lw</i> 24 full, 28 short. <i>lx</i> 24 full, 28 short. <i>ly</i> 24 full, 28 short. <i>lz</i> 24 full, 28 short. <i>ma</i> 24 full, 28 short. <i>mb</i> 24 full, 28 short. <i>mc</i> 24 full, 28 short. <i>md</i> 24 full, 28 short. <i>me</i> 24 full, 28 short. <i>mf</i> 24 full, 28 short. <i>mg</i> 24 full, 28 short. <i>mh</i> 24 full, 28 short. <i>mi</i> 24 full, 28 short. <i>mj</i> 24 full, 28 short. <i>mk</i> 24 full, 28 short. <i>ml</i> 24 full, 28 short. <i>mn</i> 24 full, 28 short. <i>mo</i> 24 full, 28 short. <i>mp</i> 24 full, 28 short. <i>mq</i> 24 full, 28 short. <i>mr</i> 24 full, 28 short. <i>ms</i> 24 full, 28 short. <i>mt</i> 24 full, 28 short. <i>mu</i> 24 full, 28 short. <i>mv</i> 24 full, 28 short. <i>mw</i> 24 full, 28 short. <i>mx</i> 24 full, 28 short. <i>my</i> 24 full, 28 short. <i>mz</i> 24 full, 28 short. <i>na</i> 24 full, 28 short. <i>nb</i> 24 full, 28 short. <i>nc</i> 24 full, 28 short. <i>nd</i> 24 full, 28 short. <i>ne</i> 24 full, 28 short. <i>nf</i> 24 full, 28 short. <i>ng</i> 24 full, 28 short. <i>nh</i> 24 full, 28 short. <i>ni</i> 24 full, 28 short. <i>nj</i> 24 full, 28 short. <i>nk</i> 24 full, 28 short. <i>nl</i> 24 full, 28 short. <i>nm</i> 24 full, 28 short. <i>no</i> 24 full, 28 short. <i>np</i> 24 full, 28 short. <i>nq</i> 24 full, 28 short. <i>nr</i> 24 full, 28 short. <i>ns</i> 24 full, 28 short. <i>nt</i> 24 full, 28 short. <i>nu</i> 24 full, 28 short. <i>nv</i> 24 full, 28 short. <i>nw</i> 24 full, 28 short. <i>nx</i> 24 full, 28 short. <i>ny</i> 24 full, 28 short. <i>nz</i> 24 full, 28 short. <i>oa</i> 24 full, 28 short. <i>ob</i> 24 full, 28 short. <i>oc</i> 24 full, 28 short. <i>od</i> 24 full, 28 short. <i>oe</i> 24 full, 28 short. <i>of</i> 24 full, 28 short. <i>og</i> 24 full, 28 short. <i>oh</i> 24 full, 28 short. <i>oi</i> 24 full, 28 short. <i>oj</i> 24 full, 28 short. <i>ok</i> 24 full, 28 short. <i>ol</i> 24 full, 28 short. <i>om</i> 24 full, 28 short. <i>on</i> 24 full, 28 short. <i>oo</i> 24 full, 28 short. <i>op</i> 24 full, 28 short. <i>oq</i> 24 full, 28 short. <i>or</i> 24 full, 28 short. <i>os</i> 24 full, 28 short. <i>ot</i> 24 full, 28 short. <i>ou</i> 24 full, 28 short. <i>ov</i> 24 full, 28 short. <i>ow</i> 24 full, 28 short. <i>ox</i> 24 full, 28 short. <i>oy</i> 24 full, 28 short. <i>oz</i> 24 full, 28 short. <i>pa</i> 24 full, 28 short. <i>pb</i> 24 full, 28 short. <i>pc</i> 24 full, 28 short. <i>pd</i> 24 full, 28 short. <i>pe</i> 24 full, 28 short. <i>pf</i> 24 full, 28 short. <i>pg</i> 24 full, 28 short. <i>ph</i> 24 full, 28 short. <i>pi</i> 24 full, 28 short. <i>pj</i> 24 full, 28 short. <i>pk</i> 24 full, 28 short. <i>pl</i> 24 full, 28 short. <i>pm</i> 24 full, 28 short. <i>pn</i> 24 full, 28 short. <i>po</i> 24 full, 28 short. <i>pp</i> 24 full, 28 short. <i>pq</i> 24 full, 28 short. <i>pr</i> 24 full, 28 short. <i>ps</i> 24 full, 28 short. <i>pt</i> 24 full, 28 short. <i>pu</i> 24 full, 28 short. <i>pv</i> 24 full, 28 short. <i>pw</i> 24 full, 28 short. <i>px</i> 24 full, 28 short. <i>py</i> 24 full, 28 short. <i>pz</i> 24 full, 28 short. <i>qa</i> 24 full, 28 short. <i>qb</i> 24 full, 28 short. <i>qc</i> 24 full, 28 short. <i>qd</i> 24 full, 28 short. <i>qe</i> 24 full, 28 short. <i>qf</i> 24 full, 28 short. <i>qg</i> 24 full, 28 short. <i>qh</i> 24 full, 28 short. <i>qi</i> 24 full, 28 short. <i>qj</i> 24 full, 28 short. <i>qk</i> 24 full, 28 short. <i>ql</i> 24 full, 28 short. <i>qm</i> 24 full, 28 short. <i>qn</i> 24 full, 28 short. <i>qo</i> 24 full, 28 short. <i>qp</i> 24 full, 28 short. <i>qq</i> 24 full, 28 short. <i>qr</i> 24 full, 28 short. <i>qs</i> 24 full, 28 short. <i>qt</i> 24 full, 28 short. <i>qu</i> 24 full, 28 short. <i>qv</i> 24 full, 28 short. <i>qw</i> 24 full, 28 short. <i>qx</i> 24 full, 28 short. <i>qy</i> 24 full, 28 short. <i>qz</i> 24 full, 28 short. <i>ra</i> 24 full, 28 short. <i>rb</i> 24 full, 28 short. <i>rc</i> 24 full, 28 short. <i>rd</i> 24 full, 28 short. <i>re</i> 24 full, 28 short. <i>rf</i> 24 full, 28 short. <i>rg</i> 24 full, 28 short. <i>rh</i> 24 full, 28 short. <i>ri</i> 24 full, 28 short. <i>rj</i> 24 full, 28 short. <i>rk</i> 24 full, 28 short. <i>rl</i> 24 full, 28 short. <i>rm</i> 24 full, 28 short. <i>rn</i> 24 full, 28 short. <i>ro</i> 24 full, 28 short. <i>rp</i> 24 full, 28 short. <i>rq</i> 24 full, 28 short. <i>rr</i> 24 full, 28 short. <i>rs</i> 24 full, 28 short. <i>rt</i> 24 full, 28 short. <i>ru</i> 24 full, 28 short. <i>rv</i> 24 full, 28 short. <i>rw</i> 24 full, 28 short. <i>rx</i> 24 full, 28 short. <i>ry</i> 24 full, 28 short. <i>rz</i> 24 full, 28 short. <i>sa</i> 24 full, 28 short. <i>sb</i> 24 full, 28 short. <i>sc</i> 24 full, 28 short. <i>sd</i> 24 full, 28 short. <i>se</i> 24 full, 28 short. <i>sf</i> 24 full, 28 short. <i>sg</i> 24 full, 28 short. <i>sh</i> 24 full, 28 short. <i>si</i> 24 full, 28 short. <i>sj</i> 24 full, 28 short. <i>sk</i> 24 full, 28 short. <i>sl</i> 24 full, 28 short. <i>sm</i> 24 full, 28 short. <i>sn</i> 24 full, 28 short. <i>so</i> 24 full, 28 short. <i>sp</i> 24 full, 28 short. <i>sq</i> 24 full, 28 short. <i>sr</i> 24 full, 28 short. <i>ss</i> 24 full, 28 short. <i>st</i> 24 full, 28 short. <i>su</i> 24 full, 28 short. <i>sv</i> 24 full, 28 short. <i>sw</i> 24 full, 28 short. <i>sx</i> 24 full, 28 short. <i>sy</i> 24 full, 28 short. <i>sz</i> 24 full, 28 short. <i>ta</i> 24 full, 28 short. <i>tb</i> 24 full, 28 short. <i>tc</i> 24 full, 28 short. <i>td</i> 24 full, 28 short. <i>te</i> 24 full, 28 short. <i>tf</i> 24 full, 28 short. <i>tg</i> 24 full, 28 short. <i>th</i> 24 full, 28 short. <i>ti</i> 24 full, 28 short. <i>tj</i> 24 full, 28 short. <i>tk</i> 24 full, 28 short. <i>tl</i> 24 full, 28 short. <i>tm</i> 24 full, 28 short. <i>tn</i> 24 full, 28 short. <i>to</i> 24 full, 28 short. <i>tp</i> 24 full, 28 short. <i>tq</i> 24 full, 28 short. <i>tr</i> 24 full, 28 short. <i>ts</i> 24 full, 28 short. <i>tt</i> 24 full, 28 short. <i>tu</i> 24 full, 28 short. <i>tv</i> 24 full, 28 short. <i>tw</i> 24 full, 28 short. <i>tx</i> 24 full, 28 short. <i>ty</i> 24 full, 28 short. <i>tz</i> 24 full, 28 short. <i>ua</i> 24 full, 28 short. <i>ub</i> 24 full, 28 short. <i>uc</i> 24 full, 28 short. <i>ud</i> 24 full, 28 short. <i>ue</i> 24 full, 28 short. <i>uf</i> 24 full, 28 short. <i>ug</i> 24 full, 28 short. <i>uh</i> 24 full, 28 short. <i>ui</i> 24 full, 28 short. <i>uj</i> 24 full, 28 short. <i>uk</i> 24 full, 28 short. <i>ul</i> 24 full, 28 short. <i>um</i> 24 full, 28 short. <i>un</i> 24 full, 28 short. <i>uo</i> 24 full, 28 short. <i>up</i> 24 full, 28 short. <i>uq</i> 24 full, 28 short. <i>ur</i> 24 full, 28 short. <i>us</i> 24 full, 28 short. <i>ut</i> 24 full, 28 short. <i>uu</i> 24 full, 28 short. <i>uv</i> 24 full, 28 short. <i>uw</i> 24 full, 28 short. <i>ux</i> 24 full, 28 short. <i>uy</i> 24 full, 28 short. <i>uz</i> 24 full, 28 short. <i>va</i> 24 full, 28 short. <i>vb</i> 24 full, 28 short. <i>vc</i> 24 full, 28 short. <i>vd</i> 24 full, 28 short. <i>ve</i> 24 full, 28 short. <i>vf</i> 24 full, 28 short. <i>vg</i> 24 full, 28 short. <i>vh</i> 24 full, 28 short. <i>vi</i> 24 full, 28 short. <i>vj</i> 24 full, 28 short. <i>vk</i> 24 full, 28 short. <i>vl</i> 24 full, 28 short. <i>vm</i> 24 full, 28 short. <i>vn</i> 24 full, 28 short. <i>vo</i> 24 full, 28 short. <i>vp</i> 24 full, 28 short. <i>vq</i> 24 full, 28 short. <i>vr</i> 24 full, 28 short. <i>vs</i> 24 full, 28 short. <i>vt</i> 24 full, 28 short. <i>vu</i> 24 full, 28 short. <i>vv</i> 24 full, 28 short. <i>vw</i> 24 full, 28 short. <i>vx</i> 24 full, 28 short. <i>vy</i> 24 full, 28 short. <i>vz</i> 24 full, 28 short. <i>wa</i> 24 full, 28 short. <i>wb</i> 24 full, 28 short. <i>wc</i> 24 full, 28 short. <i>wd</i> 24 full, 28 short. <i>we</i> 24 full, 28 short. <i>wf</i> 24 full, 28 short. <i>wg</i> 24 full, 28 short. <i>wh</i> 24 full, 28 short. <i>wi</i> 24 full, 28 short. <i>wj</i> 24 full, 28 short. <i>wk</i> 24 full, 28 short. <i>wl</i> 24 full, 28 short. <i>wm</i> 24 full, 28 short. <i>wn</i> 24 full, 28 short. <i>wo</i> 24 full, 28 short. <i>wp</i> 24 full, 28 short. <i>wq</i> 24 full, 28 short. <i>wr</i> 24 full, 28 short. <i>ws</i> 24 full, 28 short. <i>wt</i> 24 full, 28 short. <i>wu</i> 24 full, 28 short. <i>wv</i> 24 full, 28 short. <i>ww</i> 24 full, 28 short. <i>wx</i> 24 full, 28 short. <i>wy</i> 24 full, 28 short. <i>wz</i> 24 full, 28 short. <i>xa</i> 24 full, 28 short. <i>xb</i> 24 full, 28 short. <i>xc</i> 24 full, 28 short. <i>xd</i> 24 full, 28 short. <i>xe</i> 24 full, 28 short. <i>xf</i> 24 full, 28 short. <i>xg</i> 24 full, 28 short. <i>xh</i> 24 full, 28 short. <i>xi</i> 24 full, 28 short. <i>xj</i> 24 full, 28 short. <i>xk</i> 24 full, 28 short. <i>xl</i> 24 full, 28 short. <i>xm</i> 24 full, 28 short. <i>xn</i> 24 full, 28 short. <i>xo</i> 24 full, 28 short. <i>xp</i> 24 full, 28 short. <i>xq</i> 24 full, 28 short. <i>xr</i> 24 full, 28 short. <i>xs</i> 24 full, 28 short. <i>xt</i> 24 full, 28 short. <i>xu</i> 24 full, 28 short. <i>xv</i> 24 full, 28 short. <i>xw</i> 24 full, 28 short. <i>xx</i> 24 full, 28 short. <i>xy</i> 24 full, 28 short. <i>xz</i> 24 full, 28 short. <i>ya</i> 24 full, 28 short. <i>yb</i> 24 full, 28 short. <i>yc</i> 24 full, 28 short. <i>yd</i> 24 full, 28 short. <i>ye</i> 24 full, 28 short. <i>yf</i> 24 full, 28 short. <i>yg</i> 24 full, 28 short. <i>yh</i> 24 full, 28 short. <i>yi</i> 24 full, 28 short. <i>yj</i> 24 full, 28 short. <i>yk</i> 24 full, 28 short. <i>yl</i> 24 full, 28 short. <i>ym</i> 24 full, 28 short. <i>yn</i> 24 full, 28 short. <i>yo</i> 24 full, 28 short. <i>yp</i> 24 full, 28 short. <i>yq</i> 24 full, 28 short. <i>yr</i> 24 full, 28 short. <i>ys</i> 24 full, 28 short. <i>yt</i> 24 full, 28 short. <i>yu</i> 24 full, 28 short. <i>yv</i> 24 full, 28 short. <i>yw</i> 24 full, 28 short. <i>yx</i> 24 full, 28 short. <i>yy</i> 24 full, 28 short. <i>yz</i> 24 full, 28 short. <i>za</i> 24 full, 28 short. <i>zb</i> 24 full, 28 short. <i>zc</i> 24 full, 28 short. <i>zd</i> 24 full, 28 short. <i>ze</i> 24 full, 28 short. <i>zf</i> 24 full, 28 short. <i>zg</i> 24 full, 28 short. <i>zh</i> 24 full, 28 short. <i>zi</i> 24 full, 28 short. <i>zj</i> 24 full, 28 short. <i>zk</i> 24 full, 28 short. <i>zl</i> 24 full, 28 short. <i>zm</i> 24 full, 28 short. <i>zn</i> 24 full, 28 short. <i>zo</i> 24 full, 28 short. <i>zp</i> 24 full, 28 short. <i>z</i>									

CRAWFORD COUNTY.

[illegible]

DALLAS COUNTY—CONTINUED.

[illegible]

STATUTORY INVESTIGATION—PART I—CONTINUED.
DALLAS COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
		1899	1900	1899.		1900.	
				Males.	Females.	Total.	Males. Females. Total.
3	General merchandise.....	2	1	4	.....	4	3
4	Milling and grain	2	2	13	.....	13	13
	Total	9	6	111	.....	111	79

DELAWARE COUNTY

1	Carriages and wagon manufactory.....	1	1	10	.....	10	12
2	Cigar manufactory	1	1	8	.....	10	7
3	Fence manufactory	1	1	.....	2	2	6
4	General merchandise.....	1	1	10	.....	13	14
5	Manufactory of woollens.....	1	1	7	7	14	7
	Total	4	4	35	11	46	39

DES MOINES COUNTY.

1	Bakery, bread and cakes.....	1	1	10	2	12	.....
2	Basket manufactory.....	1	1	65	40	105	60
3	Beer brewery.....	1	1	20	.....	7	.....
4	Broom manufactory.....	1	1	21	.....	22	.....
5	Butter and egg cold storage.....	1	1	28	5	33	.....
6	Cattle and horse slaughtering.....	1	1	.....	.....	.....	.....

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1899.			1900.			number of weeks in operation.	1899.	1900.	In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
		Males.	Females.	Total.	Males.	Females.	Total.							
3	General merchandise	2,130	.....	2,130	1,680	.....	1,680	52	52	52	47 5	.....	7 16 00	.....
4	Milling and grain	7,192	.....	7,192	9,438	.....	9,438	52	52	52	68 10 00	.....	4 10 00	.....
	Total	\$ 36,075	.....	\$ 36,075	\$ 32,130	.....	\$ 32,130	.....	.....	.....	.....	.....	.....	.....

a Average. σ One establishment only.

CAUSE OF INCREASE OR REDUCTION: / Better business, felt like giving it. π Better demand. ρ Increased business. ϕ Greater efficiency and increased cost in living. NUMBER WEEKS OPERATED: * 40 full, 10 short.

DELAWARE COUNTY.

1	Carriage and wagon manufactory	\$ 5,000	.....	\$ 5,000	\$ 4,940	.....	\$ 4,940	52	52	52	.....	.....	.....	.....
2	Cigar manufactory	4,000	600	4,600	3,750	.....	3,750	52	52	52	.....	.....	.....	.....
3	Fence manufactory .....	.....	.....	.....	2,808	.....	2,808	52	52	52	.....	.....	.....	.....
4	General merchandise	5,300	540	5,800	5,300	.....	5,300	52	52	52	.....	.....	.....	.....
5	Manufactory of woollens	1,970	1,430	3,400	1,970	.....	1,450	152	152	152	.....	.....	.....	.....
	Total	\$ 16,330	\$ 2,570	\$ 18,900	\$ 13,218	.....	\$ 1,450	.....	.....	.....	.....	.....	.....	.....

CAUSE OF INCREASE OR REDUCTION: / General prosperity. π Greater demand for labor.

NUMBER WEEKS OPERATED: * 26 full, 20 short. \dagger 37 full, 15 short.

DES MOINES COUNTY.

1	Bakery, bread and cakes	\$ 4,000	\$ 300	\$ 4,300	\$ 20,000	\$ 17,000	\$ 37,000	52	52	52	.....	.....	.....	.....
2	Basket manufactory .....	.....	.....	30,100	5,300	4,910	4,910	32	32	32	.....	.....	.....	.....
3	Beer brewery	5,300	.....	5,300	5,300	.....	5,300	52	52	52	.....	.....	.....	.....
4	Broom manufactory	5,000	150	5,150	.....	.....	.....	49	49	49	.....	.....	.....	.....
5	Butter and egg cold storage	3,000	.....	3,000	4,000	300	4,300	52	52	52	.....	.....	.....	.....
6	Casket and coffin manufactory	14,025	.....	14,025	.....	.....	.....	52	52	52	.....	.....	.....	.....

STATUTORY INVESTIGATION—PART I—CONTINUED.
DES MOINES COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
7	Cigar manufactory	3	3	66	.....	66	51	7	58
8	Clothing, retail and tailoring	3	4	74	.....	74	41	.....	41
9	Cask and barrel manufactory	3	1	16	.....	16	15	.....	15
10	Cracker and candy manufactory	2	2	41	38	79	37	25	62
11	Contractor (building)	1	1	7	.....	7	6	.....	6
12	Crate and box manufactures	1	1	7	.....	7	6	.....	6
13	Drugs (retail) and wholesale	2	3	20	2	22	30	2	32
14	Dry goods and millinery	2	3	42	20	62	71	30	101
15	Furniture, retail	2	2	14	2	16	16	.....	16
16	Furniture manufactory	2	2	173	9	182	161	11	172
17	Foundry and machine works	1	1	275	.....	275	350	2	352
18	Gas manufactory	1	1	40	.....	40	25	.....	25
19	Grocers, retail	1	1	99	12	111	85	11	96
20	Grocers, wholesale	4	3	99	100	199	125	58	183
21	Hotels and restaurants	11	9	96	7	103	67	9	76
22	Laundry	1	1	7	.....	7	7	.....	7
23	Livery and undertaking	1	1	34	.....	34	28	.....	28
24	Lumber, lath and shingles manufactory	3	3	18	.....	18	20	.....	20
25	Milling—grain, flour etc.	1	1	15	1	16	15	1	16
26	Packers, meats	1	1	10	.....	10	.....	.....	.....
27	Painting and decorating	1	1	15	25	40	60	.....	60
28	Pickle and vinegar manufactory	1	2	50	8	58	6	17	23
29	Printing, publishing and binding	1	1	73	13	86	74	2	76
30	Paper and box manufactory	1	1	162	.....	162	156	.....	156
31	Saddlery and leather goods manufactory	2	2	5	45	50	5	40	45
32	Sash, doors and office fixture manufactory	1	1	18	.....	18	26	.....	26
33	Shirt and overall manufactory	3	3	132	.....	132	17	.....	17
34	Soap manufactory	2	2	132	.....	132	140	.....	140
35	Steam fitting and plumbing	1	1	15	.....	15	14	.....	14
36	Wagon manufactory	1	1	.....	.....	.....	.....	.....	.....

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING YEAR.				
		1899.		1900.		1899.		1900.		
		Males.	Females.	Total.	Males.	Females.	Total.	Average number of weeks in operation.	Increase (per cent.)	Reduction (per cent.)
7	Cigar manufactory.....	30,800	.....	30,800	30,800	1,050	31,850	52	3 2.00	4 10.00
8	Clothing, retail and tailoring.....	44,892	.....	44,892	17,453	.....	17,453	52	15 7.5	.....
9	Cask and barrel manufactory.....	5,350	.....	5,350	7,300	.....	7,300	52	6 2.00	.....
10	Cracker and candy manufactory.....	25,360	.....	25,360	20,460	5,018	25,478	852	.....	7 10.00
11	Contractor (building).....	2,500	6,060	31,480	3,500	.....	3,500	8	.....	.....
12	Crate and box manufactories.....	3,120	.....	2,500	3,500	.....	3,500	52	.....	8 5.00
13	Drugs (retail) and wholesale.....	21,600	1,000	22,900	22,600	1,000	23,600	52	9 5.00	.....
14	Dry goods and millinery.....	26,812	7,229	34,041	23,350	7,170	30,520	52	2 2.50	.....
15	Furniture, retail.....	8,347	880	9,227	.....	.....	.....	52	.....	.....
16	Furniture manufactory.....	54,240	.....	53,790	53,790	2,322	56,118	152	.....	.....
17	Foundry and machine works.....	\$ 143,564	.....	\$ 143,564	175,260	940	176,200	52	7 5	10 00
18	Gas manufactory.....	15,267	.....	15,267	14,224	.....	14,224	52	.....	.....
19	Groceries, wholesale.....	3,016	\$ 416	3,432	3,005	494	3,554	52	10 20.00	70 3.00
20	Hotels and restaurants.....	63,662	4,820	68,382	62,628	3,103	65,731	52	2 2.00	.....
21	Laundry.....	10,834	10,345	27,159	16,278	11,674	27,952	52	.....	.....
22	Livery and undertaking.....	2,400	1,500	3,900	1,500	2,800	4,300	52	.....	.....
23	Lumber, lath and shingles manufactory.....	2,566	.....	2,566	3,300	.....	3,300	52	.....	110 10.00
24	Milling—grain, flour, etc.....	120,036	.....	120,036	115,320	.....	115,320	52	.....	.....
25	Packers, meats.....	12,538	.....	12,538	18,265	.....	18,265	52	.....	.....
26	Packing and decorating.....	9,282	520	9,802	8,528	.....	9,048	52	12 10.00	.....
27	Pickle and vinegar manufactory.....	2,600	.....	2,600	.....	520	.....	52	.....	.....
28	Printing, publishing and binding.....	35,620	2,148	37,768	32,480	1,575	34,055	48	13 2.00	.....
29	Paper and box manufactory.....	.....	.....	5,000	.....	.....	5,338	52	14 2.00	.....
30	Saddlery and leather goods manufactory.....	34,000	750	34,750	34,200	700	34,900	52	15 2.5	.....
31	Sash, doors and office fixture manufactory.....	50,664	.....	50,664	59,885	.....	59,885	52	16 3.5	16 13.00
32	Shirt and overall manufactory.....	1,940	7,200	9,140	1,732	8,060	9,792	52	.....	.....
33	Soap manufactory.....	.....	.....	13,661	.....	.....	15,183	52	17 2.00	.....
34	Steam fitting and plumbing.....	12,150	.....	12,150	10,797	.....	10,997	52	.....	18 10.00
35	Wagon manufactory.....	57,500	.....	57,500	57,220	.....	57,220	52	10 2.5	.....
36	Water supply.....	9,600	.....	9,600	9,291	.....	9,291	52	.....	.....
37	.....	.....	.....	.....	.....	.....	.....	52	.....	.....

STATUTORY INVESTIGATION—PART I—CONTINUED.
DES MOINES COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.							
			1899.			1900.				
			1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
38	Wholesale carpets and curtains	1	n	13	3	10	7	3	10	18
39	Wholesale dry goods and notions	1	1	9	1	10	1	1	10	38
40	Wholesale fruits and produce	2	2	26	3	29	35	3	3	57
41	Wholesale hardware and manufacturers	2	3	33	3	36	54	3	3	15
42	Wholesale liquors and ice	1	1	10	1	10	15	1	1	40
43	Wholesale millinery	1	n	5	2	7	7	1	1	2,275
44	Wholesale poultry and eggs	1	1	40	5	40	40	40	40	2,275
	Total	79	66	2,164	360	2,524	1,976	208		2,275

a Average. *b* Includes board and room. *c* Separate accounts for males and females not reported. *n* Not reported.

DICKINSON COUNTY.

1	Hotel	1	18	22	40	—	—
	Total	1	18	22	40	—	—

n Not reported.

DUBUQUE COUNTY.

1	Bolting and rubber manufactory	1	6	—	6	—	—
2	Beer brewing and bottling	1	110	110	110	125	125
3	Books and music, retail	1	7	3	10	9	12

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	1899.	1900.
38	Wholesale carpets and curtains.....	6,060	1,118	7,178	.....	.....	.....	.....	.....
39	Wholesale dry goods and notions.....	6,752	900	7,652	.....	.....	.....	.....	.....
40	Wholesale fruits and produce.....	19,000	1,632	20,632	.....	.....	.....	.....	.....
41	Wholesale hardware and manufacturers.....	18,164	1,848	20,012	.....	.....	.....	.....	.....
42	Wholesale liquors and ice.....	5,200	.....	5,200	.....	.....	.....	.....	.....
43	Wholesale millinery.....	4,400	850	5,250	.....	.....	.....	.....	.....
44	Wholesale poultry and eggs.....	15,000	.....	15,000	.....	.....	.....	.....	.....
	Total.....	\$ 828,397	\$ 49,646	\$ 878,043	\$ 910,904	\$ 67,724	\$ 978,628	.....	.....

DICKINSON COUNTY.

1	Hotel.....	\$ 1,500	\$ 1,000	\$ 2,500	.....	.....	.....	.....	.....
	Total.....	\$ 1,500	\$ 1,000	\$ 2,500	.....	.....	.....	.....	.....

Includes board and room.

DUBUQUE COUNTY.

1	Belt and rubber manufactory.....	\$ 4,556	.....	\$ 4,556	.....	.....	.....	.....	.....
2	Beer brewing and bottlers.....	75,000	.....	75,000	\$ 80,000	.....	\$ 80,000	.....	.....
3	Books and music, retail.....	3,600	\$ 1,200	4,800	3,500	\$ 1,500	5,000	.....	.....

a Average. *b* Includes board and room. *c* Separate accounts for males and females not reported. *d* One establishment only. *e* Cause of INCREASE OR REDUCTION: *1* Help more efficient. *2* Heavier production. *3* Better business. *4* Help struck for more and paid more. *5* Efficiency of help. *6* Better demand. *7* To stimulate help to do more. *8* Better prices. *9* Better business. *10* Cutting out non-paying departments. *11* Men hard to get. *12* Better prices for goods. *13* Increased business. *14* Rapid work. *15* Better trade conditions. *16* Increased cost of living. *17* Proficiency. *18* A union. *19* Better times. *20* Increased business. *21* Numbers weak operators. *22* 30 full, 22 short. *23* 40 full, 12 short. *24* 46 full, 10 short. *25* 26 full, 26 short. *26* 46 full, 6 short. *27* 50 full, 2 short. *28* 40 full, 12 short. *29* 46 full, 10 short. *30* 46 full, 10 short. *31* 46 full, 10 short. *32* 46 full, 10 short. *33* 46 full, 10 short. *34* 46 full, 10 short. *35* 46 full, 10 short. *36* 46 full, 10 short. *37* 46 full, 10 short. *38* 46 full, 10 short. *39* 46 full, 10 short. *40* 46 full, 10 short. *41* 46 full, 10 short. *42* 46 full, 10 short. *43* 46 full, 10 short. *44* 46 full, 10 short. *45* 46 full, 10 short. *46* 46 full, 10 short. *47* 46 full, 10 short. *48* 46 full, 10 short. *49* 46 full, 10 short. *50* 46 full, 10 short. *51* 46 full, 10 short. *52* 46 full, 10 short. *53* 46 full, 10 short. *54* 46 full, 10 short. *55* 46 full, 10 short. *56* 46 full, 10 short. *57* 46 full, 10 short. *58* 46 full, 10 short. *59* 46 full, 10 short. *60* 46 full, 10 short. *61* 46 full, 10 short. *62* 46 full, 10 short. *63* 46 full, 10 short. *64* 46 full, 10 short. *65* 46 full, 10 short. *66* 46 full, 10 short. *67* 46 full, 10 short. *68* 46 full, 10 short. *69* 46 full, 10 short. *70* 46 full, 10 short. *71* 46 full, 10 short. *72* 46 full, 10 short. *73* 46 full, 10 short. *74* 46 full, 10 short. *75* 46 full, 10 short. *76* 46 full, 10 short. *77* 46 full, 10 short. *78* 46 full, 10 short. *79* 46 full, 10 short. *80* 46 full, 10 short. *81* 46 full, 10 short. *82* 46 full, 10 short. *83* 46 full, 10 short. *84* 46 full, 10 short. *85* 46 full, 10 short. *86* 46 full, 10 short. *87* 46 full, 10 short. *88* 46 full, 10 short. *89* 46 full, 10 short. *90* 46 full, 10 short. *91* 46 full, 10 short. *92* 46 full, 10 short. *93* 46 full, 10 short. *94* 46 full, 10 short. *95* 46 full, 10 short. *96* 46 full, 10 short. *97* 46 full, 10 short. *98* 46 full, 10 short. *99* 46 full, 10 short. *100* 46 full, 10 short.

STATUTORY INVESTIGATION—PART I—CONTINUED.
DUBUQUE COUNTY—CONTINUED.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establish-ments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
		1899	1900	1899.		1900.	
				Males.	Females.	Total.	Total.
4	Brick and tile works.....	3	3	59	.....	59	55
5	Broom manufactory.....	1	1	17	.....	17	18
6	Cake and cracker bakery.....	1	2	22	.....	22	37
7	Carbonated drink manufactory.....	1	N	2	.....	2	35
8	Carriage, wagon and sleigh manufactory.....	3	3	43	.....	43	48
9	Casket and coffin manufactory.....	2	2	136	.....	136	138
10	Coal, retail, transfer and contracting.....	2	2	74	.....	74	91
11	Coal, retail, transfer and contracting.....	1	1	20	.....	20	25
12	Coal, retail, transfer and contracting.....	1	1	19	.....	19	35
13	Confectionery manufactory.....	2	2	5	.....	5	17
14	Coffee and spice manufactory.....	2	2	36	.....	36	5
15	Cigars and tobacco, wholesale	4	4	18	.....	18	34
16	Clothing, custom and ready made.....	4	4	18	.....	18	12
17	Cooperage manufactory.....	1	N	16	.....	16	33
18	Contractors, building material.....	1	3	16	.....	16	56
19	Dry goods, retail.....	4	4	45	.....	45	56
20	Electric power, light and transportation	2	1	95	.....	95	112
21	Furnishings, domestic, retail.....	2	3	97	.....	97	106
22	Furniture manufactory.....	2	3	142	.....	142	123
23	Foundry and machine shops.....	4	6	55	.....	55	107
24	Gas and coke manufactory.....	1	1	68	.....	68	122
25	Grocery, retail.....	1	1	52	.....	52	174
26	Grocery, wholesale.....	1	N	68	.....	68	44
27	Hotel.....	3	3	44	.....	44	68
28	Laundry.....	3	3	71	.....	71	74
29	Lumber manufactory.....	3	3	40	.....	40	120
30	Ma tress, spring bed, manufactory.....	1	1	17	.....	17	49
31	Milling, flour and grain.....	3	3	350	.....	350	71
32	Overall and men's furnishings manufactory.....	1	1	33	.....	33	18
33	Printing and publishing, binding, etc.....	1	1	6	.....	6	350
34	.....	1	1	30	.....	30	46
35	.....	1	1	30	.....	30	5
36	.....	1	1	147	.....	147	55
37	.....	1	1	193	.....	193	200
38	.....	1	1	18	.....	18	21
39	.....	1	1	12	.....	12	21
40	.....	1	1	12	.....	12	21

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1899.			1900.			1899.	In-crease (per cent.)	1900.	In-crease (per cent.)	1900.	number of weeks in operation.
		Males.	Females.	Total.	Males.	Females.	Total.						
4	Brick and tile works	12,825	.....	12,825	12,203	.....	12,203	*	.....	26	.....	26	.....
5	Broom manufactory	8,700	486	9,186	8,104	180	8,284	.....	.....	50	.....	50	.....
6	Cake and cracker bakery	12,285	3,752	15,537	21,403	4,065	25,468	.....	.....	52	.....	52	.....
7	Carb-mated drink manufactory	2,000	.....	2,000	.....	.....	.....	.....	.....	52	.....	52	.....
8	Carriage, wagon and sleigh manufactory	86,304	1,014	87,318	104,357	3,106	107,463	.....	.....	52	.....	52	.....
9	Casket and coffin manufactory	56,762	5,000	61,762	58,557	5,110	63,667	.....	.....	52	.....	52	.....
10	Coal, retail, transfer and contracting	28,367	.....	28,367	34,086	.....	34,086	.....	.....	52	.....	52	.....
11	Coal, retail, transfer and contracting	11,000	4,500	15,500	.....	.....	.....	.....	.....	59	.....	59	.....
12	Confectionery manufactory	14,735	.....	14,735	10,553	480	11,033	.....	.....	52	.....	52	.....
13	Coffee and spice manufactory	5,060	12,480	17,540	3,235	14,000	17,235	.....	.....	52	.....	52	.....
14	Cigar manufactory	30,093	2,197	32,290	32,112	2,248	34,360	.....	.....	52	.....	52	.....
15	Clothing, custom and ready made	16,000	1,000	17,000	15,443	800	16,243	.....	.....	50	.....	50	.....
16	Contractors, building material	17,000	.....	17,000	34,536	.....	34,536	.....	.....	50	.....	50	.....
17	Cooperage manufactory	7,225	.....	7,225	.....	.....	.....	.....	.....	.....	.....	.....	.....
18	Dry goods, retail	24,000	21,260	45,260	20,820	23,060	44,780	.....	.....	52	.....	52	.....
19	Electric power, light and transportation	37,013	600	37,613	52,352	.....	52,352	.....	.....	52	.....	52	.....
20	Furnishings, domestic, retail	45,676	1,722	47,398	52,988	1,700	54,688	.....	.....	52	.....	52	.....
21	Furniture manufactory	45,676	.....	45,676	55,517	.....	55,517	.....	.....	48	.....	48	.....
22	Foundry and machine shops	66,501	1,719	68,220	82,001	2,444	84,445	.....	.....	52	.....	52	.....
23	Gas and coke manufactory	31,000	.....	31,000	30,000	.....	30,500	.....	.....	52	.....	52	.....
24	Grocery, retail	2,008	300	2,308	88,403	2,898	91,301	.....	.....	52	.....	52	.....
25	Grocery, wholesale	83,301	3,327	86,628	.....	.....	.....	.....	.....	52	.....	52	.....
26	Hotel	14,560	9,912	24,472	18,360	6,398	24,758	.....	.....	52	.....	52	.....
27	Laundry	2,616	4,762	7,378	3,264	6,398	9,662	.....	.....	52	.....	52	.....
28	Lumber manufactory	124,281	.....	124,281	116,537	.....	116,537	.....	.....	52	.....	52	.....
29	Mattress, spring bed, manufactory	.....	.....	.....	.....	.....	.....	.....	.....	52	.....	52	.....
30	Milling, flour and grain	10,562	.....	10,562	445	.....	445	.....	.....	52	.....	52	.....
31	Overall and men's furnishings manufactory	.....	.....	.....	78,986	.....	78,986	.....	.....	52	.....	52	.....
32	Printing and publishing, binding, etc.	65,712	3,111	68,823	92,005	4,816	96,821	.....	.....	52	.....	52	.....
33	Saddlery and leather manufactory	.....	.....	.....	6,000	.....	6,000	.....	.....	52	.....	52	.....

STATUTORY INVESTIGATION—PART I—CONTINUED.
DUBUQUE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number of establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
34	Sash, door and fixture manufactory.....	2	2	450	.....	450	450	0	450
35	Soap manufactory.....	1	1	19	.....	19	35	6	41
36	Shoe manufactory.....	1	1	31	4	35	35	17	52
37	Steam fittings manufactory.....	1	#	216	26	242	217	.....	217
38	Stoves and tinware manufactory.....	1	1	7	1	8	6	.....	6
39	Vinegar and pickle manufactory.....	1	1	10	.....	10	10	1	11
40	Water supply.....	1	1	.....	.....	.....	16	.....	16
41	Wholesale boots and shoes.....	#	1	17	1	18	17	1	18
42	Wholesale crockery and glassware.....	1	1	17	4	21	18	3	21
43	Wholesale drugs.....	#	1	.....	.....	.....	20	.....	20
44	Wholesale fruits and commission.....	#	1	.....	.....	.....	23	.....	23
45	Wholesale hardware.....	1	1	26	3	29	24	3	27
46	Wholesale liquor.....	1	1	6	.....	6	8	.....	8
47	Wholesale meats.....	1	1	7	.....	7	6	.....	6
48	Wholesale notions.....	1	1	6	1	7	6	1	7
49	Wholesale paper and fancy goods.....	1	1	18	2	20	18	2	20
	Total.....	82	88	3,189	1,098	4,287	3,182	1,000	4,182

not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.		In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
34	Sash, door and fixture manufactory	153,379	812	154,191	180,000	52	..	50	..
35	Soap manufactory	15,455	812	16,267	12,433	52	..	52	..
36	Shoe manufactory	12,171	3,188	15,359	16,286	52	..	52	..
37	Steam fittings manufactory	84,702	540	85,242	3,580	51	..	44	..
38	Sieves and tinware manufactory	3,086	720	3,806	2,630	52	..	52	..
39	Vinegar and pickle manufactory	6,266	720	6,986	520	52	..	52	..
40	Water supply	8,500	600	9,100	14,000	52	..	52	..
41	Wholesale boots and shoes	8,899	914	9,813	7,100	52	..	52	..
42	Wholesale crockery and glassware	18,702	1,300	20,002	10,157	52	..	52	..
43	Wholesale drugs	7,240	360	7,600	862	52	..	52	..
44	Wholesale fruits and commission	3,080	650	3,730	14,676	52	..	52	..
45	Wholesale hardware	10,000	650	10,650	19,540	52	..	52	..
46	Wholesale liquor	18,702	1,300	20,002	19,122	52	..	52	..
47	Wholesale meats	7,240	360	7,600	1,382	52	..	52	..
48	Wholesale notions	3,080	650	3,730	5,432	52	..	52	..
49	Wholesale paper and fancy goods	10,000	650	10,650	360	52	..	52	..
	Total	\$1,225,916	\$ 87,464	\$1,313,380	\$1,387,900	52	10.00	52	10.00

2 Average. 3 Includes board and room. 4 Separate account for males and females not reported. 5 Not reported. 6 One establishment only. 7 44 full, 6 short. 8 44 full, 4 short. 9 26 full, 26 short. 10 28 full, 24 short. 11 36 full, 12 short. 12 36 full, 12 short. 13 36 full, 12 short. 14 36 full, 12 short. 15 36 full, 12 short. 16 36 full, 12 short. 17 36 full, 12 short. 18 36 full, 12 short. 19 36 full, 12 short. 20 36 full, 12 short. 21 36 full, 12 short. 22 36 full, 12 short. 23 36 full, 12 short. 24 36 full, 12 short. 25 36 full, 12 short. 26 36 full, 12 short. 27 36 full, 12 short. 28 36 full, 12 short. 29 36 full, 12 short. 30 36 full, 12 short. 31 36 full, 12 short. 32 36 full, 12 short. 33 36 full, 12 short. 34 36 full, 12 short. 35 36 full, 12 short. 36 36 full, 12 short. 37 36 full, 12 short. 38 36 full, 12 short. 39 36 full, 12 short. 40 36 full, 12 short. 41 36 full, 12 short. 42 36 full, 12 short. 43 36 full, 12 short. 44 36 full, 12 short. 45 36 full, 12 short. 46 36 full, 12 short. 47 36 full, 12 short. 48 36 full, 12 short. 49 36 full, 12 short.

CAUSE OF INCREASE OR REDUCTION: 1 Decrease in sales. 2 Better business. 3 Demanded by labor. 4 McKinley confidence and protection. 5 Demand for labor, efficiency and good will. 6 Adoption of piece work. 7 No particular cause. 8 Nominal business increase. 9 Better help. 10 Faithful service. 11 Faithful service. 12 Scarcity of labor. 13 Increased business, better profits. 14 No raw material. 15 Demand for nine hours. 16 Old wage scale asked for. 17 Seniority. 18 Better business. 19 Increase of work. 20 Nine hour day obtained.

STATUTORY INVESTIGATION—PART I—CONTINUED.
EMMET COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number of establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Butter tub and creamery supply manufactory.....	n	1	7	1	8	15	1	15
2	Grain and general merchandise.....	1	n	7	1	8	15	1	15
3	Hardware and plumbing, retail.....	1	1	7	3	10	2	3	5
4	Laundry, steam.....	1	1	8	3	11	8	4	12
5	Produce and general merchandise.....	1	1	8	3	11	8	4	12
	Total.....	4	3	24	4	28	25	7	32
n	Not reported.								

FAYETTE COUNTY.

1	Canning vegetables.....	1	1	100	100	200	150	150	300
2	Hotel.....	3	2	8	23	31	5	18	23
	Total.....	4	3	108	123	231	155	168	323

FLOYD COUNTY.

1	Bank, store and office fixtures.....	1	1	34	34	68	36	36	72
2	Farm machine manufactory.....	1	2	9	9	18	13	13	26
3	Nursery and seed.....	1	2	46	46	92	47	47	94
4	Sash, doors and moulding manufactory.....	1	1	21	21	42	22	22	44
5	Telephone exchange.....	1	n	5	3	8	8	8	16
	Total.....	5	6	115	115	230	118	118	236

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.						number of weeks in operation.	1899.		1900.	
		1899.			1900.				In-crease (per cent.)	Reduc-tion (per cent.)		
		Males.	Females.	Total.	Males.	Females.	Total.					
1	Butter tub and creamery supply manufg	\$ 1,682	\$	\$ 1,682	\$	\$	\$	52				
2	Grain and general merchandise	3,037	\$ 240	3,277				52		10.00		
3	Hardware and plumbing, retail	520		520	\$ 520	\$ 550	1,070	52		20.00		
4	Laundry, steam	3,780		3,780			4,000	52		30.00	2.5	
5	Produce and general merchandise							52				
	Total	\$ 9,019	\$ 812	\$ 9,831	\$ 520	\$ 550	\$ 5,070					

^H Not reported

NUMBER WEEKS OPERATED: * 31 full; 21 short, † 30 full; 22 short.

CAUSE OF INCREASE OR REDUCTION: † General raise of other commodities. 2 Better class of labor. 3 Demand by labor.

FAYETTE COUNTY.

1	Canning vegetables.	\$ 7,300	\$ 1,300	\$ 8,600	^c	\$ 8,000						
2	Hotel	1,960	6 4,058	6 6,018	6 1,165	6 2,827	6 3,992	8		7.5		
	Total	\$ 9,260	\$ 5,358	\$ 14,618	\$ 1,165	\$ 2,827	\$ 11,922	52		2.5		

^a Average. ^b Includes board and room. ^c Separate accounts for males and females not reported.

NUMBER WEEKS OPERATED: * More work, better business.

FLOYD COUNTY.

1	Bank, store and office fixtures	\$ 18,500		\$ 18,500	\$ 18,000			51		5.00		
2	Farm machine manufactory	2,404		2,404	2,570		2,570	51		2 10.00		
3	Nursery and seed	9,468		9,468	13,095		13,095	52		52		
4	Sash, doors and moulding manufactory	10,614		10,614	9,790		9,790	46		46		
5	Telephone exchange	1,800	\$ 720	2,520				52				
	Total	\$ 42,766	\$ 720	\$ 43,486	\$ 44,285		\$ 44,285					

CAUSE OF INCREASE OR REDUCTION: † Men demanded a raise. 2 Efficiency of workmen.

STATUTORY INVESTIGATION—PART I—CONTINUED.
FRANKLIN COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
			1899		1900.	
			1899	1900	Males.	Females. Total.
1	Brick and tile works	1	1	6	6	6
2	Hotel	1	1	5	6	15
3	Milling and grain	1	1	5	5	5
4	Poultry, eggs and produce	1	1	50	52	52
	Total	4	4	66	13	79 69 9 78

FREMONT COUNTY.

1	Brick and tile works	1	1	7	7	7	7
2	Canning, fruit	1	1	20	30	35	80
	Total	2	2	27	30	42	87

GREENE COUNTY.

1	Brick and tile works	1	1	30	30	30	30
2	Butter manufactory	1	1	8	8	8	8
3	General merchandise	2	2	3	1	4	4
	Total	4	4	41	1	42	42

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	Average number of weeks in operation.	
1	Brick and tile works	\$ 1,300		\$ 1,300	\$ 1,550		\$ 1,550	23	27
2	Hotel	6 1,420	6 1,400	6 2,820	6 1,500	6 1,440	6 2,940	52	52
3	Milling and grain	2,512		2,512	2,632		2,632	52	52
4	Poultry, eggs and produce	21,000		21,000	21,800		21,800	* 52	+ 52
	Total.	\$ 26,232	\$ 1,400	\$ 27,632	\$ 27,482	\$ 1,440	\$ 28,922		

* 6 full, 48 short. † 6 full, 48 short.

FREMONT COUNTY.

1	Brick and tile works	\$ 900		\$ 900	\$ 800		\$ 800	16	16
2	Canning, fruit	700		1,500	2,800		4,000	* 10	10
	Total	\$ 1,600	\$ 800	\$ 2,400	\$ 3,600	\$ 1,200	\$ 4,800		

NUMBER WEEKS OPERATED: * 6 full, 4 short.

GREENE COUNTY.

1	Brick and tile works	\$ 14,000		\$ 14,000				* 52	7 10.00
2	Butter manufactory	4,500		4,500	4,500		4,500	52	52
3	General merchandise	1,400		1,700				52	52
	Total	\$ 19,900	\$ 240	\$ 20,200	\$ 4,500		\$ 4,500		

NUMBER WEEKS OPERATED: * 40 full, 12 short. CAUSE OF INCREASE OR REDUCTION: † Scarcity of men.

STATUTORY INVESTIGATION—PART I—CONTINUED.
GUTHRIE COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number of establish-ments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1897	1900	1899.			1900.		
				Males.	Females.	Total.	Males.	Females.	Total.
1	Brick and tile works.....	1	1	8	.....	8	8	.....	8
2	Coal mining.....	4	4	29	.....	29	30	.....	30
3	Hotel.....	1	"	3	5	8	.....	.....	.....
4	Woolen goods manufactory.....	1	"	8	5	13	.....	.....	.....
	Total.....	7	5	48	10	58	38	.....	38
	n Not reported.								

HAMILTON COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1897	1900	1899.			1900.		
				Males.	Females.	Total.	Males.	Females.	Total.
				Males.	Females.	Total.	Males.	Females.	Total.
1	Agricultural implements manufactory.....	1	2	50	.....	50	60	2	62
2	Bakery and confectionery.....	1	"	2	18	20	.....	.....	.....
3	Boot and shoe manufactory.....	1	"	20	6	26	3	6	9
4	Dry goods, general merchandise.....	1	1	18	.....	18	19	.....	19
5	Foundry and heater manufactory.....	2	"	18	17	35	15	25	40
6	Hotel.....	1	1	1	25	26	11	10	21
7	Laundry, steam.....	1	1	12	.....	12	13	.....	13
8	Printing and publishing.....	1	"	1	.....	1	.....	.....	.....
9	Tailoring.....	10	6	141	69	210	97	33	130
	Total.....								

STATUTORY INVESTIGATION—PART I—CONTINUED.

HANCOCK COUNTY:

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899.	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Agricultural implement manufacturing.....	1	2	8		8			
2	Hotel.....	2	2	4	13	17			
3	Telephone exchange.....	1	1	10	5	15	12	4	16
	Total.....	4	1	22	18	40	12	4	16

² Not reported.

// Not reported.

HARDIN COUNTY.

[illegible]

Not reported.

Marital number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)
1	Agricultural implement manufactory.....	\$ 2,200	...	\$ 2,200	...	...	...	...	...
2	Hotel.....	<i>c</i> 3,020	<i>c</i> 3,020	<i>b</i> 3,020	...	...	...	...	...
3	Telephone.....	3,600	1,300	4,900	\$ 7,540	\$ 960	\$ 8,500	52	52
	Total.....	\$ 5,800	\$ 1,300	\$ 10,120	\$ 7,540	\$ 960	\$ 8,500	...	...

c Separate accounts for males and females not reported. *b* Includes board and room.

HARDIN COUNTY.

1	Brick and tile work.....	\$ 5,768	\$ 484	\$ 6,252	\$ 8,300	...	\$ 8,300	...	...
2	Creamery and general merchandise.....	1,600	500	2,100	1,700	...	1,700	...	...
3	Egg packing.....	1,900	...	2,400	9,100	\$ 1,004	10,104	...	...
4	General merchandise.....	<i>b</i> 1,116	<i>b</i> 1,585	<i>b</i> 2,701	...	...	...	...	...
5	Hotel.....	1,560	1,400	2,960	...	...	...	...	...
6	Laundry, steam.....	4,200	375	4,575	...	...	...	...	...
7	Merchant tailoring.....	3,492	1,265	4,757	...	...	...	...	...
8	Real estate and loans.....	4,000	...	4,000	4,000	...	4,000	...	...
9	Stone quarrying.....	2,200	...	2,200	2,392	...	2,392	...	...
10	Transfer and drayage.....	...	...	...	...	...	...	...	...
	Total.....	\$ 25,836	\$ 5,609	\$ 31,445	\$ 25,492	\$ 1,004	\$ 26,496	...	...

b Includes board and room. NUMBER WEEKS OPERATED: * 28 full, 24 short. † 36 full, 16 short. ‡ 30 full, 22 short. CAUSE OF INCREASE OR REDUC-TION: 1 efficiency of help. 2 demanded by help. 3 better help and better business.

STATUTORY INVESTIGATION—PART I—CONTINUED.
HARRISON COUNTY.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.				
			1899.		1900.		
			1899	1900	Males.	Females.	Total.
1	Brick and tile works.....	2	2	12	12	12	12
2	Hotel.....	1	1	8	14	22	6
3	Milling and electric power.....	1	1	5	5	6	6
4	Printing and publishing.....	1	1	9	6	15	12
	Total.....	5	3	34	20	54	18

n Not reported.

HENRY COUNTY.

1	Brick and tile works.....	1	1	10	10	9	9
2	Hotel.....	1	1	3	7	10	11
3	Milling and grain planing mill and lumber yard.....	1	1	6	2	11	21
4	Printing and publishing.....	2	2	12	6	12	12
	Total.....	6	6	46	15	61	14

HOWARD COUNTY.

1	Dry goods and general merchandise.....	n	1	1	1	3	5
2	Hotel.....	n	1	1	1	3	9
3	Laundry, steam.....	1	1	1	4	5	6
4	Nursery, seeds and shrubs.....	2	2	25	25	18	22
5	Tow manufacturing.....	3	6	26	4	45	15
	Total.....	3	6	30	4	80	80

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.		In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
1	Brick and tile works.....	\$ 2,894		\$ 2,894	\$ 3,053	25		26	
2	Hotel.....	2,700	2,918	5,618	2,300	48		52	
3	Milling and electric power.....	2,300	500	2,800		52			
4	Printing and publishing.....	2,002							
	Total.....	\$ 9,894	\$ 3,718	\$ 13,612	\$ 5,353				

Includes board and room. α average. CAUSE OF INCREASE OR REDUCTION: γ prosperity and advance in prices.

HENRY COUNTY.

1	Brick and tile works.....	\$ 1,074		\$ 1,074	\$ 2,333				
2	Hotel.....	1,750	611	2,361	61,010	52		52	
3	Milling and grain.....	4,280	611	4,891	605	52		52	
4	Planing mill and lumber yard.....	4,000		4,000	1,250	40		52	
5	Printing and publishing.....	2,332	1,272	3,604		52			
	Total.....	\$ 13,356	\$ 2,953	\$ 16,259	\$ 15,425				

Includes board and room. NUMBER WEEKS OPERATED: α 24 full, 18 short, γ 18 full, 22 short, δ 28 full, 12 short, ϵ 18 full, 22 short.

HOWARD COUNTY.

1	Dry goods and general merchandise.....				\$ 1,860	\$ 800	\$ 2,660		
2	Hotel.....				1,600	1,186	2,786	52	
3	Laundry, steam.....	\$ 277	\$ 500	\$ 777	277	110	1,093	40	
4	Nursery, seeds and shrubs.....				1,650		1,760	36	
5	Tow manufacturing.....	6,315		6,315	4,872			25	20 00
	Total.....	\$ 6,592	\$ 500	\$ 7,092	\$ 10,320	\$ 7,722	\$ 13,071		

Includes board and room. NUMBER WEEKS OPERATED: α 20 full, 20 short, γ 15 full, 25 short. CAUSE OF INCREASE OR REDUCTION: γ Better prices.

STATUTORY INVESTIGATION—PART I—CONTINUED.

HUMBOLDT COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number estab- lish- ments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.						
			1899.			1900.			
			1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Dry goods and general merchandise.....	1	1	5	3	8	5	3	8
	Total.....	1	1	5	3	8	5	3	8

IDA COUNTY.

1	Light and heat.	n	1				5		5
2	Lumber and coal.		1				2		2
	Total		2				7		7
n	Not reported.								

IOWA COUNTY.

1	Brick and tile works.	2	2	30		30	29		29
2	Dry goods and general merchandise.	1	1	3	2	5	4	1	5
3	Hotel.	1	n	4	4	8			
4	Milling and grain.	1	n	7		7			
	Total	5	3	44	6	50	33	1	34
n	Not reported.								

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.						Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.			1900.			1899	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.			In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
1	Dry goods and general merchandise.....	\$ 2,700	\$ 1,560	\$ 4,260	\$ 2,560	\$ 1,460	\$ 4,020	52	52	7 10.00			
	Total.....	\$ 2,700	\$ 1,560	\$ 4,260	\$ 2,560	\$ 1,460	\$ 4,020						
NUMBER WEEKS OPERATED: * 40 full, 12 short. CAUSE OF INCREASE OR REDUCTION: 7 Length of service made help more valuable.													

NUMBER WEEKS OPERATED: * 40 full, 12 short. CAUSE OF INCREASE OR REDUCTION: † Length of service made help more valuable.

IDA COUNTY.

1	Light and heat.				\$ 3,000		\$ 3,000	52	52	
2	Lumber and coal.				1,660		1,660	52	52	
	Total.				\$ 4,660		\$ 4,660			

IOWA COUNTY.

1	Brick and tile works.	\$ 6,800		\$ 6,800	\$ 7,080		\$ 7,080	36	30	7 10.00
2	Dry goods and general merchandise.	c	c	c 28.0	3,000	600	3,600	52	52	
3	Hotel.	c	c	c 1,050				12	12	
4	Milling and grain.	3,192		3,192				40	40	
	Total.	\$ 9,992		\$ 13,840	\$ 10,080	\$ 600	\$ 10,680			

‡ Includes board and room. c Separate accounts for males and females not reported. CAUSE OF INCREASE OR REDUCTION: † Labor hard to keep.

STATUTORY INVESTIGATION—PART I—CONTINUED.
JACKSON COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
				1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Butter tub and barrel head manufactory	2	1	17	.....	17	4	.....	4
2	Butter manufactory	n	1	.....	.....	.....	2	.....	2
3	Cigar manufactory	1	1	5	.....	5	.....	.....	.....
4	Hotel	1	1	.....	.....	.....	3	.....	3
5	Lime manufactory	2	1	80	.....	80	15	7	22
6	Woollen goods manufactory	1	n	10	.....	10	.....	.....	.....
7	Wholesale, tobacco and cigars	1	1	5	.....	5	6	1	7
	Total	8	6	123	12	135	37	8	45
n	Reported, manufactory closed.								

n Reported, manufactory closed.

JASPER COUNTY.

1	Brick and tile works	1	1	11	.....	11	10	.....	10
2	Coal mining	2	3	281	.....	283	202	1	203
3	Clothing manufactory	1	n	18	50	68	.....	.....	.....
4	Dry goods and general merchandise	1	n	18	17	35	.....	.....	.....
5	Hotels and restaurants	3	2	10	32	42	14	21	35
6	Foundry and implement manufactory	3	3	50	.....	50	123	1	124
7	Milling, grain, cereals, flour, etc	n	1	.....	.....	.....	6	.....	6
	Total	11	10	442	101	543	354	24	378

n Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.			INCREASE OR REDUCTION OF DAILY WAGES DURING—		
		1899.		1900.	1899.		1900.
		Males.	Females.	Total.	Males.	Females.	Total.
1	Butter tub and barrel head manufactory.	\$ 4,750		\$ 4,750	\$ 1,103		\$ 1,104
2	Butter manufactory.	1,886		2,093	738		1,738
3	Cigar manufactory.	h 300	\$ 207	h 595	1,505		1,505
4	Hotel manufactory.	29,500	h 225	h 1,260	h 1,440		h 1,440
5	Lime manufactory.	1,552	363	2,015	4,000		4,000
6	Woolen goods manufactory.	5,800	520	6,320	520		520
7	Wholesale, tobacco and cigars.						
	Total.	\$ 43,788	\$ 1,315	\$ 45,103	\$ 14,877	\$ 760	\$ 15,637

a Average. b Includes room and board. NUMBER WEEKS OPERATED: *34 full, 14 short, 730 full, 10 short. CAUSE OF INCREASE OR REDUCTION: 1 Better times, 2 Less work.

JASPER COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.			INCREASE OR REDUCTION OF DAILY WAGES DURING—		
		1899.		1900.	1899.		1900.
		Males.	Females.	Total.	Males.	Females.	Total.
1	Brick and tile works.	\$ 1,500		\$ 1,500	\$ 2,000		\$ 2,000
2	Coal mining.	153,274	720	153,994	120,031	720	120,751
3	Clothing manufactory.	4,926	8,100	13,026	13,026		13,026
4	Dry goods and general merchandise.	1,979	984	2,963	3,930		3,930
5	Hotels and restaurants.	h 4,900	h 4,754	h 9,714	h 3,792	h 3,930	h 7,722
6	Foundry and implement manufactory.	28,082	421	28,503	55,801	200	56,001
7	Milling, grain, cereals, flour, etc.				3,200		3,200
	Total.	\$ 104,751	\$ 14,979	\$ 119,730	\$ 181,621	\$ 5,286	\$ 186,907

NUMBER WEEKS OPERATED: *36 full, 12 short, 736 full, 16 short, 725 full, 27 short. CAUSE OF INCREASE OR REDUCTION: Demand of brick. 2 Better demand for coal and miners. 3 Prosperity. b Includes board and room.

STATUTORY INVESTIGATION—PART I—CONTINUED.

JEFFERSON COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.								
		Number establishments reporting.		1899.				1900.		
				1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Agricultural tool manufactory	1	1	1	38	2	40	42	2	44
2	Brick and tile works	1	1	1	20	1	20	19	1	19
3	Cigar manufactory	n	n	n	n	n	n	n	n	n
4	Hotel	1	1	1	4	9	13	4	10	14
5	Laundry, steam	1	1	1	2	4	6	2	4	6
6	Mitten and glove manufactory	n	n	1	5	5	10	12	12	12
7	Merchant tailoring	1	1	1	6	2	8	6	2	8
8	Printing and publishing	1	1	1	70	1	71	70	1	71
9	Wagon manufactory	1	1	1	1	1	1	1	1	1
	Total	-8	7	7	145	23	168	70	30	109

n Not reported.

JOHNSON COUNTY.

1	Agricultural implement manufactory	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
---	------------------------------------	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING					
		1899.		1900.		1899.		1900.			
		Males.	Females.	Total.	Males.	Females.	Total.	Average number of weeks in operation.	Increase (per cent.)	Reduction (per cent.)	Increase (per cent.)
1	Agricultural tool manufactory.....	\$ 17,163	\$ 677	\$ 17,840	\$ 17,963	\$ 705	\$ 18,668	52	7	10.00	
2	Brick and tile works.....	5,366		5,366	6,142		6,142	38			
3	Cigar manufactory.....				2,623		2,623	52			
4	Hotel.....	750	1,248	1,798	750	1,362	2,112	52			
5	Laundry, steam.....	832	1,066	1,898	800		1,595	52			
6	Mitten and glove manufactory.....				1,000	1,000	1,000	26			
7	Merchant tailoring.....	2,070	1,280	3,310				52			
8	Printing and publishing.....	2,860	676	3,536	3,800	624	4,424	52			
9	Wagon manufactory.....	27,842	536	28,378				52			
	Total.....	\$ 56,843			\$ 32,078	\$ 4,416	\$ 36,494	50	2	10.00	
Total.....											
δ In ludes board and room. NUMER WEEKS OPERATED: * 34 full, 4 short, † 40 full, 12 short, ‡ 34 full, 16, short. CAUSE OF INCREASE OR REDUCTION: Efficiency of labor. 2 Demand for labor.											

♂ In ludes board and room. NUMBER WEEKS OPERATED: * 34 full, 4 short, † 40 full, 12 short, ‡ 34 full, 16 short. CAUSE OF INCREASE OR REDUCTION: Efficiency of labor. 2 Demand for labor.

JOHNSON COUNTY.

1	Agricultural implement manufactory	\$ 1,740	\$ 780	\$ 2,520	\$ 15,778	\$ 530	\$ 15,778	52	52	
2	Bread and cake bakery	2,860		2,860	1,960		2,510	52	52	
3	Brick and tile works	2,080		2,080	5,000		5,000	48	26	
4	Cigar manufactory	2,080	240	2,320	1,440		1,440	52	52	
5	Clothing manufactory	2,580	240	2,820	2,940	240	3,180	52	52	
6	Dry goods, general merchandise	1,518	2,926	4,444				52	52	
7	Fence, tank and wind mill manufactory	1,520	1,272	2,792				52	52	
8	Hotels and restaurants	6	6	12				52	52	
9	Mitten and glove manufactory	3,056	2,792	5,848	6,000	7,000	13,000	8	52	10 25.00
10	Laundry, steam	1,813	1,856	3,669	2,748	1,544	4,292	52	52	11 11.00
11	Milling and grain	3,500		3,500	1,750		1,750	52	32	
12	Painting and decorating	6,400		6,400				52	52	
13	Perfumery manufactory	16,000	5,500	21,500	16,000	5,500	21,500	52	52	
14	Printing and publishing	23,150	3,457	26,607	4,250	300	4,550	52	52	10 5.00

STATUTORY INVESTIGATION—PART I—CONTINUED.
JOHNSON COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		Number establishments reporting.		1899			1900.
		1899	1900	Males.	Females.	Total.	Total.
15	Who, esale grocery.....	1	1	9	1	10	8
16	Wholesale jewelry and manufactory.....	1	1	5	15	20	11
	Total.....	18	13	187	91	278	159
	Not reported.						90
							255

JONES COUNTY.

1	Agricultural implement manufactory.....	1	1	8	.....	8	6
2	Butter tub manufactory (penitentiary).....	1	1	.....	.....	.....	32
3	Duster manufactory.....	2	2	20	40	60	15
4	Stone quarries.....	.....	.....	469	.....	469	100
	Total.....	4	5	497	40	537	153
	Establishment not in operation in 1899.						30
							183

KEOKUK COUNTY.

1	Brick and tile works.....	3	2	25	.....	25	19
2	Coal mining.....	5	5	340	.....	340	434

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)
15	Wholesale grocery	5,770	262	6,030	5,800	275	6,075	52	
16	Wholesale jewelry and manufactory	2,780	4,200	6,980	6,660	6,324	12,984	52	
	Total	\$ 74,557	\$ 22,139	\$ 96,696	\$ 70,346	\$ 21,693	\$ 92,039		

^a Includes board and room. ^o One establishment only.

CAUSE OF INCREASE OR REDUCTION: ¹ Had to in order to keep help. ² General increase in wages. ³ Slight increase to steady help. ⁴ Efficiency. NUMBER WEEKS OPERATED: ^o 40 full, 12 short. ¹ 32 full, 16 short. ² 30 full, 34 short. ³ 35 full, 17 short. ⁴ 18 full, 34 short. ⁵ 40 full, 6 short.

JONES COUNTY.

1	Agricultural implement manufactory	\$ 3,250		\$ 3,250	\$ 3,072		\$ 3,072	* 52	
2	Butter tub manufactory, (penitentiary)				3,118		5,690	† 47	
3	Duster manufactory	c		8,874	3,219	4,101	7,219	† 49	
4	Stone quarries	25,875		25,875	34,223		34,223	† 30	
	Total	\$ 39,125		\$ 37,000	\$ 46,013	\$ 4,101	\$ 50,114		

^a Average. ^c Separate accounts for males and females, not reported. ^o One establishment only.

CAUSE OF INCREASE OR REDUCTION: ¹ Lack of laborers. NUMBER WEEKS OPERATED: * 28 full, 24 short. † 45 full, 2 short. ‡ 24 full, 25 short. § 33 full, 17 short. || \$1,080, wages paid to free labor; \$4,550, wages paid for convict labor.

KEOKUK COUNTY.

1	Brick and tile works	\$ 5,663		\$ 5,663	\$ 6,640		6,640	† 30	† 105.00
2	Coal mining	195,981		195,981	226,120		226,120	† 50	† 12.5

STATUTORY INVESTIGATION—PART I—CONTINUED.

KEOKUK COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
3	Hotel.....	1	11	3	10	13	20	20	20
4	Mining tool manufactory.....	1	1	18	10	18	20	20	20
	Total.....	10	8	386	10	396	473	473	473
n. Not reported									

KOSSUTH COUNTY.

1	Butter tub and tank manufactory.....	1	11	1	12	12	1	14
2	Brick and tile works.....	1	6	6	6	5	0	5
3	Hotel.....	1	1	6	7	5	10	15
4	Laundry, steam.....	1	2	6	8	4	4	8
5	Milling, grain and general merchandise.....	1	7	7	7	6	6	6
	Total.....	5	27	13	40	33	15	48

LEE COUNTY.

1	Agricultural implement manufactory.....	2	151	2	153	80	2	82
2	Agricultural small tool manufactory (free labor).....	1	30	38	38	38	38	38
3	Agricultural small tool manufactory (convict labor).....	1	158	155	155	155	155	155

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	Increase (per cent.)	Reduction (per cent.)
3	Hotel.....	9,974	6	1,500	9,628	.....	9,628	52	.....
4	Mining tool manufactory.....	9,974	6	9,974	9,628	.....	9,628	52	52
	Total.....	\$211,618	.....	\$213,118	\$242,388	.....	\$242,388	.....	.....

b Includes room and board. c Separate accounts for males and females, not reported. d One establishment only.
 / CAUSE OF INCREASE OR REDUCTION. Better times. 2 Organization of labor and operators.
 * NUMBER OF WEEKS OPERATED. 22 full, 8 short. † 26 full, 9 short. ‡ 30 full, 20 short. § 30 full, 20 short.

KOSSUTH COUNTY.

1	Butter tub and tank manufactory.....	\$ 5,000	\$ 200	\$ 5,200	\$ 6,023	\$ 260	\$ 6,283	* 48	.....
2	Brick and tile works.....	738	.....	738	471	.....	471	18	.....
3	Hotel.....	200	6	1,160	6	1,680	2,580	52	.....
4	Laundry, steam.....	1,000	1,500	2,500	1,552	1,040	2,592	52	.....
5	Milling, grain and general merchandise.....	4,020	.....	4,020	3,530	.....	3,530	48	.....
	Total.....	\$ 10,958	\$ 2,660	\$ 13,618	\$ 12,476	\$ 2,980	\$ 15,456	.....	.....

b Includes room and board.
 CAUSE OF INCREASE OR REDUCTION: / Unable to get men. 2 More work and better service from help.
 NUMBER WEEKS OPERATED: * 45 full, 3 short. † 43 full, 9 short.

LEE COUNTY.

1	Agricultural implement manufactory.....	\$ 33,275	\$ 400	\$ 33,675	\$ 29,625	\$ 576	\$ 30,201	a 40	.....
2	Agri. small tool manufactory (free labor).....	28,107	.....	28,107	35,041	.....	35,041	52	.....
3	Agri. small tool manufactory (convict labor).....	25,280	.....	25,280	23,258	.....	23,258	52	.....
	Bag manufacturers.....	c	.....	5,867	.....	.....	.....	28	.....

STATUTORY INVESTIGATION—PART I—CONTINUED.

LEE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
4	Barrel and keg manufactory	2	2	105	.....	105	80	.....	80
5	Brewery of beer and soft drinks	2	1	14	.....	14	8	.....	8
6	Brick manufactory	1	1	6	.....	6	9	.....	9
7	Button blank manufactory (convict labor).	1	1	.....	.....	.....	55	.....	55
8	Cake and candy manufactory	1	1	13	3	16	.....	.....	.....
9	Canning—vegetables and pickles	2	2	70	102	172	80	119	205
10	Can manufactory	1	1	100	50	150	90	40	130
11	Carriage manufactory	1	1	6	.....	6	6	.....	6
12	Chair manufactory (free labor)	1	1	25	.....	25	25	.....	25
13	Chair manufactory (convict labor)	1	1	139	.....	139	139	.....	139
14	Clear manufactory	1	1	.....	.....	.....	6	.....	6
15	Cl-clothing and furnishings, retail	2	2	10	.....	10	11	.....	11
16	Coal and ice, retail and wholesale.	1	2	150	.....	150	174	1	175
17	Dry goods, retail.	3	2	15	20	35	25	19	44
18	Furniture and office fixture manufactory	1	1	14	.....	14	10	.....	10
19	Furnishing, carpets, retail.	1	"	7	.....	7	16	.....	16
20	Gas manufactory	2	2	27	9	36	16	6	22
21	Hardware manufactory	2	2	9	.....	9	2	.....	2
22	Hotels and restaurants.	2	2	23	12	35	8	.....	12
23	Insurance, fire.	4	3	45	26	71	39	22	61
24	Laundry, steam.	1	1	12	10	22	11	11	22
25	Lumber and planing mills, wholesale.	2	2	7	14	21	28	14	42
26	Medicine (proprietary) manufactory	2	2	289	6	295	321	4	325
27	Merchant tailoring.	1	1	185	.....	185	191	3	194
28	Merchandise, wholesale and retail	1	"	11	.....	11	10	.....	10
29	Packers, wholesale eggs	1	1	13	12	25	10	25	35
30	Painters and decorating	2	"	20	.....	20	20	.....	20
31	.....	1	1	.....	.....	.....	4	.....	4
32	.....	2	2	23	.....	23	25	.....	25
33	.....	1	1	.....	.....	.....	46	.....	46
34	.....	1	1	.....	.....	.....	.....	.....	.....
35	.....	1	1	.....	.....	.....	.....	.....	.....
36	.....	1	1	.....	.....	.....	.....	.....	.....
37	.....	1	1	.....	.....	.....	.....	.....	.....
38	.....	1	1	.....	.....	.....	.....	.....	.....
39	.....	1	1	.....	.....	.....	.....	.....	.....
40	.....	1	1	.....	.....	.....	.....	.....	.....
41	.....	1	1	.....	.....	.....	.....	.....	.....
42	.....	1	1	.....	.....	.....	.....	.....	.....
43	.....	1	1	.....	.....	.....	.....	.....	.....
44	.....	1	1	.....	.....	.....	.....	.....	.....
45	.....	1	1	.....	.....	.....	.....	.....	.....
46	.....	1	1	.....	.....	.....	.....	.....	.....
47	.....	1	1	.....	.....	.....	.....	.....	.....
48	.....	1	1	.....	.....	.....	.....	.....	.....
49	.....	1	1	.....	.....	.....	.....	.....	.....
50	.....	1	1	.....	.....	.....	.....	.....	.....
51	.....	1	1	.....	.....	.....	.....	.....	.....
52	.....	1	1	.....	.....	.....	.....	.....	.....
53	.....	1	1	.....	.....	.....	.....	.....	.....
54	.....	1	1	.....	.....	.....	.....	.....	.....
55	.....	1	1	.....	.....	.....	.....	.....	.....
56	.....	1	1	.....	.....	.....	.....	.....	.....
57	.....	1	1	.....	.....	.....	.....	.....	.....
58	.....	1	1	.....	.....	.....	.....	.....	.....
59	.....	1	1	.....	.....	.....	.....	.....	.....
60	.....	1	1	.....	.....	.....	.....	.....	.....
61	.....	1	1	.....	.....	.....	.....	.....	.....
62	.....	1	1	.....	.....	.....	.....	.....	.....
63	.....	1	1	.....	.....	.....	.....	.....	.....
64	.....	1	1	.....	.....	.....	.....	.....	.....
65	.....	1	1	.....	.....	.....	.....	.....	.....
66	.....	1	1	.....	.....	.....	.....	.....	.....
67	.....	1	1	.....	.....	.....	.....	.....	.....
68	.....	1	1	.....	.....	.....	.....	.....	.....
69	.....	1	1	.....	.....	.....	.....	.....	.....
70	.....	1	1	.....	.....	.....	.....	.....	.....
71	.....	1	1	.....	.....	.....	.....	.....	.....
72	.....	1	1	.....	.....	.....	.....	.....	.....
73	.....	1	1	.....	.....	.....	.....	.....	.....
74	.....	1	1	.....	.....	.....	.....	.....	.....
75	.....	1	1	.....	.....	.....	.....	.....	.....
76	.....	1	1	.....	.....	.....	.....	.....	.....
77	.....	1	1	.....	.....	.....	.....	.....	.....
78	.....	1	1	.....	.....	.....	.....	.....	.....
79	.....	1	1	.....	.....	.....	.....	.....	.....
80	.....	1	1	.....	.....	.....	.....	.....	.....
81	.....	1	1	.....	.....	.....	.....	.....	.....
82	.....	1	1	.....	.....	.....	.....	.....	.....
83	.....	1	1	.....	.....	.....	.....	.....	.....
84	.....	1	1	.....	.....	.....	.....	.....	.....
85	.....	1	1	.....	.....	.....	.....	.....	.....
86	.....	1	1	.....	.....	.....	.....	.....	.....
87	.....	1	1	.....	.....	.....	.....	.....	.....
88	.....	1	1	.....	.....	.....	.....	.....	.....
89	.....	1	1	.....	.....	.....	.....	.....	.....
90	.....	1	1	.....	.....	.....	.....	.....	.....
91	.....	1	1	.....	.....	.....	.....	.....	.....
92	.....	1	1	.....	.....	.....	.....	.....	.....
93	.....	1	1	.....	.....	.....	.....	.....	.....
94	.....	1	1	.....	.....	.....	.....	.....	.....
95	.....	1	1	.....	.....	.....	.....	.....	.....
96	.....	1	1	.....	.....	.....	.....	.....	.....
97	.....	1	1	.....	.....	.....	.....	.....	.....
98	.....	1	1	.....	.....	.....	.....	.....	.....
99	.....	1	1	.....	.....	.....	.....	.....	.....
100	.....	1	1	.....	.....	.....	.....	.....	.....

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				DAILY WAGES DURING—					
		1899.		1900.		1899.		1900.			
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
4	Barrel and keg manufactory.	35,200		35,200	29,000		29,000	52		52	
5	Brewery of beer and soft drinks.	6,756		6,756	4,000		4,000	52		52	
6	Brick manufactory.	1,367		1,367	2,805		2,805	28		28	
7	Button blank manufactory (convict labor).				8,645		8,645	52		52	
8	Cake and candy manufactory.	6,210	832	c 15,202	c	c	c 16,362	52		52	
9	Canning, vegetable s and pickles.			c 18,776			c 19,000	146		146	
10	Can manufactory.	12,566	6,210	2,000	14,000	5,000	19,000	152		152	
11	Carriage manufactory.	2,000		15,000	15,000		15,000	50		50	
12	Chair manufactory (free labor).	15,000		17,868	16,462		17,062	50		50	
13	Chair manufactory (convict labor).	17,868		5,723	2,220		2,220	44		44	
14	Cigar manufactory.	5,723		5,723	5,709		5,709	52		52	
15	Clothing and furnishings, retail.	9,261		9,261	14,915	240	14,915	848		848	
16	Coal and ice, retail and wholesale.	8,156	6,668	14,824	8,904	6,128	15,092	52		52	
17	Dry goods, retail.	6,706		6,706	7,005		7,005	52		52	
18	Furniture and machine manufactory.	2,616		2,616				52		52	
19	Furniture and office fixture manufactory.	13,826	3,728	17,554	7,500	2,500	10,000	52		52	
20	Furnishings, carpets, retail.	5,036	136	5,172	6,343	740	7,083	52		52	
21	Gas manufactory.	11,348	884	12,232	2,640	728	3,368	47		47	
22	Hardware manufactory.	b 12,842	b 3,390	b 16,232	b 2,470	b 3,156	b 5,626	52		52	
23	Hotels and restaurants.	10,388	2,991	13,379	20,148	4,595	24,673	52		52	
24	Insurance, fire.	2,350	2,254	4,604	2,602	2,610	5,212	52		52	
25	Laundry, steam.	c	121,405	172,696	c 701	c	173,397	50		50	
26	Lumber and planing mills, wholesale.	73,000	1,000	74,000	c	c	c 75,696	52		52	
27	Medicine (proprietary) manufactory.	8,200	1,000	9,200	8,000	4,500	12,500	50		50	
28	Merchant tailoring.	6,000	2,000	8,000			14,500	40		40	
29	Millinery, wholesale and retail.	6,520		6,520	8,470		11,500	152		152	
30	Packers, butter and eggs.	7,088	617	7,705	8,470	300	8,770	8852		9 10.00	
31	Painters and decorating.				18,400		19,800	44			
32	Paper manufactory, strawboard.										

STATUTORY INVESTIGATION—PART I—CONTINUED.

LEE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
				1899.		1900.	
		1899	1900	Males.	Females.	Total.	Total.
32	Printers and bookbinders.....	5	5	69	9	78	62
33	Pickle and vinegar manufactory.....	1	1	12	44	56	9
34	Powder manufactory.....	1	1	110	27	137	200
35	Saddlery and horse collar manufactory.....	3	2	27	23	50	81
36	Sash door and blind manufactory.....	1	1	49	151	200	41
37	Shirt, coat and pants manufactory.....	1	1	100	150	250	126
38	Shoe manufactory.....	1	1	15	28	43	100
39	Starch manufactory.....	1	1	12	12	24	15
40	Steam heating supply manufactory.....	1	1	60	60	120	60
41	Stove and range manufactory.....	1	1	12	12	24	15
42	Stoves and tin-ware, retail.....	1	1	12	12	24	15
43	Transfer and transportation.....	3	1	33	16	49	16
44	Wheel manufactory, cast iron.....	1	1	55	60	115	60
45	Wholesale and retail carpets.....	1	1	28	4	32	7
46	Wholesale and retail drugs.....	1	1	7	7	14	7
47	Wholesale fruits and produce.....	1	1	6	5	11	7
48	Wholesale general merchandise.....	1	1	66	6	72	67
49	Wholesale groceries.....	4	4	14	3	17	15
50	Wholesale jewelry and musical goods.....	1	1	8	3	11	2
51	Wholesale oils.....	1	1	8	3	11	3
	Total.....	79	66	2,917	711	3,628	2,521
	Total.....						609
	Total.....						3,130

n Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1899.				1900.				number of weeks in operation.	1899.		1900.	
		Males.		Females.		Total.		Males.			Females.		Total.	
		1899.		1900.		Total.		1899.			1900.		Total.	
32	Printers and bookbinders.....	35,796	2,886	38,682	37,372	2,867	40,239	52	52	52	.....	52	52	.....
33	Pickle and vinegar manufactory.....	6,477	3,597	10,074	6,280	2,739	9,023	52	52	52	.....	52	52	.....
34	Powder manufactory.....	55,609	.....	55,609	75,866	.....	75,866	52	52	52	.....	52	52	.....
35	Saddlery and horse collar manufactory.....	7,000	.....	7,000	7,000	.....	7,000	52	52	52	.....	52	52	.....
36	Sash, door and blind manufactory.....	147,805	2,103	149,908	39,958	312	40,270	52	52	52	.....	52	52	.....
37	Shirt, coat and pants manufactory.....	.....	.....	76,119	.....	.....	76,119	52	52	52	.....	52	52	.....
38	Shoe manufactory.....	12,655	.....	12,655	.....	.....	12,655	52	52	52	.....	52	52	.....
39	Starch manufactory.....	12,000	.....	12,000	4,660	4,020	16,660	52	52	52	.....	52	52	.....
40	Steam heating supply manufactory.....	5,280	.....	5,280	7,400	.....	12,680	52	52	52	.....	52	52	.....
41	Stove and range manufactory.....	18,000	.....	18,000	15,936	.....	33,936	52	52	52	.....	52	52	.....
42	Stoves and tinware, retail.....	7,079	.....	7,079	.....	.....	7,079	52	52	52	.....	52	52	.....
43	Transfer and transportation.....	16,460	.....	16,460	7,000	.....	23,460	52	52	52	.....	52	52	.....
44	Wheel manufactory, cast iron.....	36,168	.....	36,168	40,258	.....	76,426	52	52	52	.....	52	52	.....
45	Wholesale and retail carpets.....	10,352	974	11,326	4,500	.....	15,826	52	52	52	.....	52	52	.....
46	Wholesale and retail drugs.....	4,772	.....	4,772	3,500	.....	8,272	52	52	52	.....	52	52	.....
47	Wholesale fruit and produce.....	2,776	.....	2,776	4,500	.....	7,276	52	52	52	.....	52	52	.....
48	Wholesale general merchandise.....	1,200	2,000	3,200	61,240	2,034	63,274	52	52	52	.....	52	52	.....
49	Wholesale groceries.....	41,513	2,035	43,548	9,750	850	53,298	52	52	52	.....	52	52	.....
50	Wholesale jewelry and musical goods.....	10,000	1,100	11,100	8,750	.....	19,850	52	52	52	.....	52	52	.....
51	Wholesale oils.....	6,700	1,500	8,200	8,140	1,560	9,700	52	52	52	.....	52	52	.....
Total.....		\$ 792,851	\$ 48,505	\$ 841,356	\$ 797,646	\$ 46,886	\$ 844,532	One establishment only.						

α	Average.	β	Includes board and room.	γ	Separate account for males and females not reported.	δ	One establishment only.
α	NUMBER WEEKS OPERATED: *	β	30 full, 10 short.	γ	28 full, 18 short.	δ	26 full, 26 short.
α	30 full, 20 short.	β	30 full, 22 short.	γ	30 full, 17 short.	δ	44 full, 6 short.
α	10 short.	β	25 full, 20 short.	γ	35 full, 26 short.	δ	4 full, 42 short.
α	11 full.	β	25 full, 26 short.	γ	35 full, 26 short.	δ	4 full, 42 short.
α	22 short.	β	26 full, 26 short.	γ	26 full, 26 short.	δ	26 full, 26 short.
CAUSE OF INCREASE OR REDUCTION: 1 Plenty of work. 2 Left state. 3 Better demand for goods. 4 Cheaper help. 5 Increase of business. 6 Men struck for it. 7 Men wanted it. 8 Increased trade. 9 Agreement with painter's union. 10 More to do. 11 Improvement in business. 12 Agreement with union molders. 13 Volume of wages higher, increase per cent. none. 14 General prosperity and efficiency.							

Total.....

Average.....

Includes board and room.....

Separate account for males and females not reported.....

Number weeks operated.....

30 full, 20 short.....

30 full, 10 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

30 full, 22 short.....

STATUTORY INVESTIGATION—PART I—CONTINUED.
LINN COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number of establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Bakery, bread and cakes	1	1	11	2	13	17	3	20
2	Barber	1	1	7		7	7		7
3	Canning, vegetables and corn	1	1	40	135	175	50	140	190
4	Cereal manufactory	1	1	250	200	450	288	218	506
5	Clothing, retail	2	1	21	4	25	7	1	8
6	Coactionary manufactory	1	1	14	26	40	22	28	50
7	Cracker and biscuit manufactory	1	1	48	55	103	34	51	85
8	Creamery and dairy supplies	1	1	5		5	7		7
9	Crockery, glassware, etc., retail	1	1	12	3	15	11	4	15
10	Cutlery manufactory	1	1	79		79	14		14
11	Dry goods and general merchandise	6	5	32	130	209	45	100	145
12	Electric light and power	1	1	31		31	6		6
13	Fence manufactory	1	1	6		6			
14	Foundry and machine shop	1	1	30		30	58		58
15	Furniture dealers, retail	1	1	8		8	8		8
16	Furniture manufactory	2	2	30		30	44		44
17	Gas manufactory	1	1	16		16	19		19
18	Gun stock and hard wood manufactory	1	1	140		140			
19	Hardware and sheet iron works	1	1	7		7	8		8
20	Hotels and restaurants	1	1	47	60	107	44	62	106
21	Ice, retail	4	4	38		38	39		39
22	Implement dealers (agricultural)	3	3	16	6	22	11	2	13
23	Insurance (fire)	1	1	23		23	23		23
24	Laundry, steam	1	1	6		6			
25	Licensed oil mill	2	2	25	21	46	6	6	12
26	Lumber, retail	2	2	12		12	12		12
27	Mill supplies and electrical work	1	1	14		14	16		16
28	Milling and grain	1	1	630	1	631	685	1	686

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.	1900.	1899		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
1	Bakery, bread and cakes.....	\$ 5,500	\$ 500	\$ 6,000	\$ 8,600	\$ 720	\$ 9,320	52		52	
2	Barber.....	4,000		4,000	4,000		4,000				
3	Canning, vegetables and corn.....			7,526			8,172	5		5	
4	Cereal manufactory.....	98,932	37,732	136,664	154,501	54,825	209,326	4		4	
5	Clothing, retail.....	14,423	1,258	15,681	4,700		5,000	52		52	
6	Confectionery manufactory.....	10,000	5,000	15,000	16,000		21,000	52		52	
7	Cracker and biscuit manufactory.....	31,397	9,387	40,784	27,550		36,110	52	5	52	
8	Creamery and dairy supplies.....	2,760		2,760	4,200		4,200	52		52	
9	Crockery, glassware, etc., retail.....			11,500			11,500	52		52	
10	Cutlery manufactory.....				4,000		4,000				
11	Dry goods and general merchandise.....	37,109	33,413	70,522	22,596	26,086	48,682	52	10	52	
12	Electric light and power.....	16,718		16,718							
13	Fence manufactory.....	2,500		2,500	4,000	60	4,060	52	10	52	
14	Foundry and machine shop.....	12,870		12,870	23,524		23,524	52	3	52	
15	Furniture dealers, retail.....	4,000		4,000	4,000		4,000	52	3	52	
16	Furniture manufactory.....	16,350		16,350	17,194	350	17,544	52	5	52	
17	Gas manufactory.....	7,500		7,500	9,000		9,000	52	10	52	
18	Gun stock and hard wood manufactory.....	35,000		35,000							
19	Hardware and sheet iron works.....	2,000		2,000	2,830		2,830	52		52	
20	Hotels and restaurants.....	9,866	9,256	19,122	10,276	10,362	20,638	52		52	
21	Ice, retail.....	18,356		18,356	12,469		12,469	52		52	
22	Implement dealers (agricultural).....	5,088	840	5,928	9,587	957	10,544	52		52	
23	Insurance (fire).....	25,238		25,238	26,525		26,525	52		52	
24	Laundry, steam.....	2,954	4,327	7,281	500	1,728	2,228	52		52	
25	Lined oil mill.....	12,143		12,143	3,513		3,513	52		52	
26	Lumber, retail.....	7,500		7,500	8,650		8,650	52		52	
27	Mill supplies and electrical work.....	7,500	450	7,950	8,345	260	8,585	52	10	52	
28	Milling and grain.....	13,155	345	13,500	11,575	140	11,715	52	15	52	
29	Packing, beef and pork.....	27,452	4,000	27,452	395,943	5,000	331,543	52		52	

STATUTORY INVESTIGATION—PART I—CONTINUED.
LINN COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899		1899		1900.			
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
30	Painting and wall paper.....	3	1	37	2	39	12	.....	12
31	Paint manufactory.....	1	1	4	.....	4	2	.....	2
32	Pharmacy compound manufactory (medicine).....	1	1	10	.....	10	10	.....	10
33	Printing and publishing.....	2	2	60	5	65	77	11	88
34	Pump (iron and wood) manufactory.....	2	2	80	.....	80	19	.....	19
35	Sash door and blind manufactory.....	2	1	98	.....	98	89	.....	89
36	Stone quarrying and road ballast.....	2	2	85	.....	85	85	.....	85
37	Transfer and transportation.....	2	2	83	2	85	84	.....	84
38	Wagon manufactory.....	1	1	20	.....	20	10	.....	10
39	Water supply.....	1	1	28	.....	28	23	.....	23
40	Wholesale and retail coal.....	1	1	8	.....	8	.....	.....	.....
41	Wholesale beer and brewing.....	1	1	18	.....	18	30	.....	30
42	Wholesale beverages, carbonated.....	1	1	18	.....	18	.....	.....	.....
43	Wholesale grocery.....	5	3	68	.....	68	56	1	57
44	Wholesale meats.....	1	1	4	.....	4	8	.....	8
45	Wholesale millinery.....	1	1	20	.....	20	.....	.....	.....
46	Wholesale wall paper and stationery.....	1	1	20	3	23	18	2	20
47	Wind mills and tank manufactory.....	1	1	15	.....	15	25	1	16
	Total.....	69	50	2,180	680	2,860	2,112	669	2,771

Total

* Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING		
		1899.		1900.		1899.	1900.	1899.		1900.
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)
30	Painting and wall paper.	18,352	1,020	19,372	5,760	5,760	5,760	...	...	...
31	Paint manufactory.	3,500	794	4,294	1,000	1,000	1,000	...	...	...
32	Pharmacy compound manufactory (medicine)	6,263	2,000	8,263	8,088	988	9,076	...	...	...
33	Printing and publishing	50,469	1,200	51,669	50,613	3,020	53,633	100 15.0	...	11 0 10.0
34	Pump (iron and wood) manufactory	38,000	1,200	39,200	48,372	768	49,140	12 10 00	...	13 5 00
35	Sash, door and blind manufactory	36,143	5,000	41,143	34,128	990	35,118	14 20 00	...	...
36	Stone quarrying and road ballast.	5,000	900	5,900	10,000	24	10,024	...	...	...
37	Transfer and transportation	40,194	10,200	50,394	39,844	52	40,366	...	...	...
38	Wagon manufactory	10,200	11,912	22,112	5,200	52	5,200	...	...	...
39	Water supply	11,912	5,078	16,990	10,089	52	10,089	...	...	...
40	Wholesale and retail coal.	6,520	6,520	13,040	13,787	32	13,787	...	...	...
41	Wholesale beer and brewing	51,865	3,000	54,865	45,646	52	45,646	...	...	...
42	Wholesale beverages, carbonated	3,000	3,000	6,000	7,020	52	7,020	...	...	...
43	Wholesale grocery	8,008	1,000	9,008	9,273	52	9,273	...	...	...
44	Wholesale meats	10,831	480	11,311	11,201	52	11,201	...	...	...
45	Wholesale millinery	...	...	...	...	...	...	...	...	...
46	Wholesale wall paper and stationery.	...	...	...	...	...	...	...	...	...
47	Wind mills and tank manufactory	...	...	...	...	...	...	...	...	...
	Total	\$ 981,540	\$ 113,902	\$ 1,095,442	\$ 1,026,875	\$ 121,936	\$ 1,172,185	...	...	...

6 Includes board and room. c Separate accounts for males and females not reported. o One establishment only.
 NUMBER OF WEEKS OPERATED: * 22 full, 23 short. † 26 full, 26 short. ‡ 45 full, 7 short. § 40 full, 12 short. || 30 full, 22 short. ¶ 40 full, 12 short. ** 48 full, 4 short. †† 42 full, 10 short. ††† 22 full, 30 short. §§ 36 full, 14 short. ||| 35 full, 17 short. †††† 46 full, 16 short. ††††† 12 full, 12 short.
 CAUSE OF INCREASE OR REDUCTION: 1 Increase in cost of living; 2 Ability of help; 3 Efficiency of help; 4 Ability of help; 5 Wages were too low; 6 More and better work; 7 Recognition of good service; 8 Increased cost of living; 9 More business; 10 Efficiency of help; 11 Shorter work day; 12 Better business; 13 Men demanded it; 14 Shortage of men.

STATUTORY INVESTIGATION—PART I—CONTINUED.

LOUISA COUNTY.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899.		1899.		1900.		1900.	
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Canning vegetables	1	1	66	25	91	150	50	200
2	Hotel	2	2	5	8	13	5	8	13
3	Printing and publishing	1	<i>n</i>	4	3	7			
4	Soap manufactory	1	<i>n</i>	5		5			
	Total	5	3	80	36	116	155	58	213

n Not reported.

LUCAS COUNTY.

[illegible]

Marginal number.	INDUSTRY OR KIND OF BUSINESS	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	Average number of weeks in operation.	
1	Canning vegetables	c	c	c \$ 9,522	c	c	c \$ 14,914	* 48	48
2	Hotel	b \$ 840	b \$ 1,288	b 2,128	b \$ 795	b \$ 1,290	b 2,085	52	52
3	Printing and publishing	c	c	c 2,000	c	c	c	52	52
4	Soap manufactory	c 1,993	c	1,993	c	c	c	52	52
	Total	\$ 2,833	\$ 1,298	\$ 15,643	\$ 795	\$ 1,290	\$ 16,999		

b Includes board and room. c separate accounts for males and females not reported.

NUMBER WEEKS OPERATED: * 4 full, 44 short. 16 full, 42 short.

CAUSE OF INCREASE OR REDUCTION: / Help more proficient

LUCAS COUNTY.

1	Broom and brush manufactory.	\$ 3,276		\$ 3,276	\$ 1,711		\$ 1,711		
2	Carriage and wagon manufactory.	6,500		6,500	7,800		7,800		
3	Coal mining	44,299		44,299	231,686		231,686		
4	Dry goods and general merchandise.	2,120	\$ 1,648	3,768	1,950	\$ 2,600	4,550		
5	Grain and Lumber	12,000		12,000					
6	Hotel	b 876	b 1,847	b 2,723					
	Total	\$ 69,071	\$ 3,495	\$ 72,566	\$243,141	\$ 2,600	\$ 245,741		

NUMBER WEEKS OPERATED: * 40 full, 12 short.

CAUSE OF INCREASE OR REDUCTION: / Increase demanded. 2 Demand for men and coal. 3 Contract with union miners.

STATUTORY INVESTIGATION—PART I—CONTINUED

MADISON COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Dry goods and general merchandise.....	1	1	8	.....	8	9	.....	9
2	Hotel	1	1	3	5	8	3	5	8
3	Milling and grain.....	"	1	.....	.....	.....	3	.....	3
	Total.....	2	2	11	5	16	15	5	20
" Not reported.									

MARION COUNTY.

1	Canning and pickling, vegetables.....	1	1	60	80	140	50	60	110
2	Coal mining.....	5	3	209	.....	209	88	.....	88
3	Printing and publishing.....	1	"	3	2	5	.....	.....	.....
4	Wagon manufactory.....	1	"	25	.....	25	.....	.....	.....
	Total.....	8	4	297	82	379	138	60	198
" Not reported.									

MAHASKA COUNTY.

1	Bakery and confectionery.....	1	1	6	1	7	6	1	7
2	Boiler and heater manufactory.....	"	1	.....	.....	.....	12	2	14
3	Brick manufactory.....	2	1	65	.....	65	50	.....	50
4	Clear manufactory.....	2	3	18	.....	18	29	3	32
5	Coal mining.....	14	11	2,117	3	2,120	1,760	.....	1,760
6	Clothing manufactory.....	2	1	13	30	43	11	1	12
7	Dry goods and general merchandise.....	2	2	22	49	71	23	56	79
8	Electric lighting and power.....	1	1	9	.....	9	10	.....	10

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.			Females.	Total.	In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
1	Dry goods and general merchandise	\$ 3,356		\$ 3,356	\$ 3,688			.....	.....	.....	.....
2	Hotel	\$ 728	\$ 650	\$ 1,378	\$ 810	52	52	.....	.....	.....	.....
3	Milling and grain				600	16	16	.....	.....	.....	.....
	Total	\$ 4,084	\$ 650	\$ 4,734	\$ 5,128		\$ 5,020	.....	.....	.....	.....

MARION COUNTY.

		\$	2,700	\$	3,300	\$	6,000	\$	3,430	\$	1,843	\$	5,273	12	8		
1	Canning and pickling, vegetables																
2	Coal mining		98,436		98,436		98,436		41,390		41,390		41,390	40	40	2012	10.00
3	Printing and publishing		1,175		375		1,550		1,550					52			
4	Wagon manufactory		11,000				11,000							48			
	Total	\$113,311		\$3,675	\$116,986			\$44,759		\$1,843		\$46,602					

a Average. CAUSE OF INCREASE OR REDUCTION: 1 Scarcity of fuel. 2 Short crop. 3 Scale for mining made uniform.

a Average. **CAUSE OF INCREASE OR REDUCTION:** 1 Scarcity of help. 2 Short crop. 3 a Scale for mining made uniform.

MAHASKA COUNTY.

	\$	355	\$	2,850	\$	260	\$	3,110	52	52	
1 Bakery and confectionery	3,000										
2 Boiler and heater manufactory				10,000		525		10,525			2.00
3 Brick manufactory	18,375		18,375	15,000				15,000	26	30	
4 Cigar manufactory	7,501		7,501	13,224		610		13,834	50	50	5.00
5 Coal mining	1,088,198	975	1,089,173	1,022,569				1,022,569	45	52	32 10.00
6 Clothing manufactory		c	13,032	7,000		360		7,360	45	52	32 15.00
7 Dry goods and general merchandise	13,450	16,557	30,007	14,400		17,269		31,669	52	52	52 10.00
8 Electric lighting and power	5,940		5,940	5,986				5,986	52	52	

STATUTORY INVESTIGATION—PART I—CONTINUED.

MAHASKA COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899	1900	1899.			1900.		
				Males.	Females.	Total.	Males.	Females.	Total.
9	Groceries, retail.....	1	n	5	.....	5	.....	.....	.....
10	Harness manufactory.....	1	1	9	.....	9	.....	.....	.....
11	Hotel.....	1	1	10	17	27	10	16	26
12	Laundry, steam.....	1	1	8	10	18	8	10	18
13	Lumber and planing mill, sash doors, etc.....	1	1	16	1	17	12	.....	12
14	Printing and publishing.....	3	2	25	13	38	13	4	17
15	Structural iron and bridge manufactory.....	n	1	.....	.....	.....	20	.....	20
16	Telephone exchange, local.....	1	1	4	8	12	4	8	12
17	Transfer and livery.....	1	n	25	1	26	.....	.....	.....
18	Wholesale egg dealers.....	1	1	16	1	17	6	.....	6
19	Wholesale grocery.....	1	1	21	2	23	23	2	25
20	Wholesale and retail hardware.....	1	1	11	.....	11	12	.....	12
	Total.....	37	32	2,400	137	2,537	2,014	103	2,117

n Not reported.

MARSHALL COUNTY.

1	Brick and tile manufactory.....	2	3	26	.....	26	45	.....	45
2	Buggy and wagon manufactory.....	1	1	89	11	100	90	10	100
3	Candy and syrup manufactory.....	1	1	20	20	40	22	8	30
4	Cake and biscuit manufactory.....	n	1	10	6	16	.....	.....	.....
5	Dry goods and general merchandise.....	5	5	28	34	62	27	28	55
6	Electric power, and light, gas, etc.....	1	1	24	.....	24	23	1	24
7	Furniture and carpets, retail.....	1	1	8	.....	8	7	.....	7

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING	
		1899.		1900.		1899.	1900.	1899.	1900.
		Males.	Females.	Total.	Total.			In-crease (per cent.)	Reduction (per cent.)
9	Groceries, retail	1,080	1,080	1,080	1,080	52	52	..	..
10	Harness manufactory	3,750	4,230	7,980	7,980	52	52	..	..
11	Hotel	3,104	6,278	9,382	9,382	52	52	..	..
12	Laundry, steam	3,184	6,210	9,394	9,394	52	52	..	..
13	Lumber and planing mill, sash doors, etc.	10,608	7,750	18,358	18,358	52	52	..	..
14	Printing and publishing	13,508	3,556	17,064	17,064	52	52	..	..
15	Structural iron and bridge manufactory	3,000	2,920	5,920	5,920	52	52	..	..
16	Telephone exchange, local	9,042	485	9,527	9,527	52	52	..	..
17	Transfer and livery	2,146	56	2,202	2,202	52	52	..	..
18	Wholesale egg dealers	22,500	1,010	23,510	23,510	52	52	..	..
19	Wholesale grocery	5,373	5,573	10,946	10,946	52	52	..	..
20	Wholesale and retail hardware	1,214,201	32,024	1,246,225	1,246,225	52	52	..	..
	Total			\$1,246,225	\$1,246,225				

a Average. *b* Includes board and room. *c* Separate accounts for males and females not reported.

NUMBER WEEKS OPERATING: *d* ¹⁴ full, ¹⁰ short.

CAUSE OF INCREASE OR REDUCTION: *e* Demand. *f* Men demanded more. *g* Organization of men and operators. *h* Labor organized. *i* Efficiency of labor. *j* Demand for labor. *k* More help and some advances.

MARSHALL COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING	
		1899.		1900.		1899.	1900.	1899.	1900.
		Males.	Females.	Total.	Total.			In-crease (per cent.)	Reduction (per cent.)
1	Brick and tile manufactory	6,120	6,120	12,240	12,240	20	22	..	..
2	Buggy and wagon manufactory	38,161	1,590	39,751	39,751	52	52	..	..
3	Candy and syrup manufactory	5,200	1,590	6,790	6,790	52	52	..	..
4	Cake and biscuit manufactory	14,410	1,200	15,610	15,610	52	52	..	..
5	Dry goods and general merchandise	13,180	10,818	23,998	23,998	52	52	..	..
6	Electric power and light, gas, etc.	5,192	156	5,348	5,348	52	52	..	..
7	Furniture and carpets, retail	13,180	156	13,336	13,336	52	52	..	..

STATUTORY INVESTIGATION—PART I—CONTINUED.
MARSHALL COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
8	Groceries and crockery, retail.	1	n	7	1	8			
9	Hardware, retail.	1	1	7	1	8	6	1	7
10	Hotels.	2	1	28	15	43	2	7	9
11	Ice, wholesale and retail.	1	n	a	25	a			
12	Implement dealers, retail.	1	1						
13	Iron works, structural.	n	1	34		34	45		45
14	Laundry, steam.	2	2	10	19	29	9		29
15	Lumber and planing mills.	1	2	6	1	7	23	2	25
16	Machine shop and foundry.	1	1	61	1	62	73	2	75
17	Milling and grain.	1	n	7		7			
18	Printing and publishing.	2	2	61	6	65	40		40
19	Pickle and vinegar manufactory.	1	n	9		9			
20	Pork packing, cold storage.	1	1	125		125	110	15	125
21	Stone quarrying and carving.	1	n	124		124			
22	Tallow, hides and wool.	1	1	14		14	15	1	16
23	Transfer and livery.	2	n	21	1	22			
24	Wholesale grocery.	2	1	34	4	38	28	2	30
	Total.	33	26	778	125	903	569	98	667

a Average. n Not reported.

MILLS COUNTY.

1	Neck yoke manufactory.	1	1	5	1	6	2	1	3
---	------------------------	---	---	---	---	---	---	---	---

BUREAU OF LABOR STATISTICS

Marginal number.	INDUSTRY OR KIND OF BUSINESS.						number of weeks in operation.	
	1899.			1900.			1899.	1900.
	Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)
8 Groceries and crockery, retail.....	2,940	480	3,420	3,600	480	4,080	25.00	
9 Hardware, retail.....	4,000	480	4,480	6,150	1,150	7,300	63.00	
10 Hotels.....	6 10,693	b 2,904	7 13,597	c 6,650	d 1,800	e 8,450	23.00	
11 Ice, wholesale and retail.....	5,000		5,000					
12 Implement dealers, retail.....				3,000		3,000		
13 Iron works, structural.....	12,582		12,582	10,060		10,060	20.00	
14 Laundry, steam.....	5,045	5,074	10,119	5,005	5,144	10,149	0.50	
15 Lumber and planing mills.....	3,470	645	4,115	13,933	1,105	15,038	263.00	
16 Machine shop and foundry.....	20,655	450	27,135	34,555	760	35,315	29.00	
17 Milling and grain.....	4,000		4,000					
18 Printing and publishing.....	25,097	512	25,609	38,198		38,198	50.00	
19 Slaughterhouses.....	3,108	1,200	4,308					
20 Pickle and vinegar manufactory.....	47,608		47,608	e			8.00	
21 Pork packing, cold storage.....	4,505		4,505	7,000	500	7,500	66.00	
22 Stone quarry and ring.....		150		5,000		5,000	100.00	
23 Tailor and dress making.....	3,040		3,040					
24 Wholesale grocery.....	28,382	2,080	30,462	30,000	1,200	31,200	3.90	
Total.....	\$ 312,750	\$ 27,509	\$ 340,259	\$ 266,642	\$ 24,035	\$ 343,854		

a Average. b Includes board and room. c Separate accounts for males and females not reported. f Full time, full force. g Reduced time, reduced force.
o one establishment only.
p NUMBER WEEKS OPERATED: * 38 full, 14 short. + 36 full, 12 short. † 36 full, 22 short. ‡ 26 full, 26 short. ¶ 12 full, 40 short.
q CAUSE OF INCREASE OR REDUCTION: 1 Scarcity of help. 2 Good business. 3 Increase of business. 4 Scarcity of skilled labor. 5 Good times.
r Demand for help. 7 Better business. 8 Demanded by labor. 9 Scarce of skilled help. 10 Better business.

MILLS COUNTY.

MILLS COUNTY.

1 Neck yoke manufactory	\$ 3,150	\$ 350	\$ 3,500	\$ 760	\$ 240	\$ 1,000	\$ 52	.....	.....
Total.....	\$ 3,150	\$ 350	\$ 3,500	\$ 760	\$ 240	\$ 1,000	\$ 52	.....	.....

STATUTORY INVESTIGATION—PART I—CONTINUED.

MITCHELL COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Hotel.....	1	1	3	7	10	.....	.....	.....
2	Tow manufactory.....	1	1	.....	.....	.....	9	.....	9
	Total.....	1	1	3	7	10	9	.....	9
n Not reported.									

MONONA COUNTY.

1	General merchandise, dry goods.....	1	1	5	3	8	.....	.....	.....
2	Sorghum manufactory.....	1	1	10	.....	10	10	.....	10
	Total.....	2	1	15	3	18	10	.....	10
n Not reported.									

MONROE COUNTY

1	Canning vegetables.....	1	1	20	30	50	.....	.....	.....
2	Cigar manufactory.....	2	2	10	4	14	.....	.....	.....
3	Coal mining.....	3	4	1,203	5	1,208	1,327	.....	1,327
4	Hotel.....	1	1	4	4	8	5	.....	5
5	Temperance beverage manufactory.....	1	1	.....	.....	.....	3	.....	3

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.						Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING				
		1899.			1900.			1899.	1900.	1899.		1900.		
		Males.	Females.	Total.	Males.	Females.	Total.			Increase (per cent.)	Reduction (per cent.)	Increase (per cent.)	Reduction (per cent.)	
1	Hotel	\$ 960	\$ 2,040	\$ 3,000				52						
2	Tow manufactory			\$ 1,554			\$ 1,554		11					
	Total	\$ 960	\$ 2,040	\$ 3,000	\$ 1,554		\$ 1,554							

b Includes board and room

MONONA COUNTY:

1	General merchandise, dry goods	\$ 2,700	\$ 1,064	\$ 2,704					
2	Sorghum manufactory	600		600	\$ 555		\$ 555	52	
								6	
									4
									25.00
	Total..	\$ 3,300	\$ 1,064	\$ 3,364	\$ 555		\$ 555		

a Railroad extension made help scarce.

MONROE COUNTY.

[illegible]

a Average; *b* includes board and room.

CAUSE OF INCREASE OR REDUCTION: / Prosperous business; 2 miners organized and we made agreement with them.

STATUTORY INVESTIGATION—PART I—CONTINUED.
MONTGOMERY COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Bee hive and tank manufactory	1	1	42	1	43	36	1	37
2	Brick and tile manufactory	3	4	49	...	49	53	...	53
3	Dry goods and general merchandise	1	1	2	3	5	2	18	5
4	Hotels	2	2	4	16	20	6	...	24
5	Lumber and coal, retail	1	1	10	...	10	13	...	13
6	Milling and grain	1	1	10	...	10	10	...	10
7	Printing and publishing	1	1	9	1	10	22	21	43
8	Stock food manufactory	1	1	...	...	...	3	...	3
9	Wholesale grocery	1	1	5	1	6	5	2	7
	Total	11	14	131	22	153	150	45	195

* Not reported.

MUSCATINE COUNTY.

1	Brick and tile manufactories, pearl	2	4	18	...	18	28	...	28
2	Button blank manufactories, pearl	7	7	267	...	267	245	...	245
3	Button manufactories, pearl, blanks and finishing	3	4	70	220	290	115	335	450
4	Contractor and builder	1	1	16	...	16	8	...	8
5	Cigar manufactories	2	2	8	11	19	2	9	17
6	Clear manufactories	2	2	...	...	...	2	...	2
7	Drugs, retail	3	3	17	36	53	14	34	48
8	Dry goods and general merchandise	1	1	10	...	10	8	...	8
9	Foundry and structural iron works	1	1	5	13	18	5	...	9
10	Laundry, steam	2	2	352	...	352	454	...	454
11	Lumber manufactory, boxes and shooks	1	1	...	2	...	...	...	...
12	Lumber manufactory, laths and shingles	1	1	246	...	246	260	...	260
13	Lumber, wholesale	1	1	...	...	...	404	...	404

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.	INCREASE OR REDUCTION OF DAILY WAGES DURING				
		1899.		1900.			1899.		1900.		
		Males.	Females.	Total.	Males.		Females.	Total.	Increase (per cent.)	Reduction (per cent.)	Increase (per cent.)
1	Bee hive and tank manufactory.....	\$ 15,000	250	\$ 16,700	\$ 10,410	\$ 182	\$ 10,592	* 52	† 52	.....	.....
2	Brick and tile manufactory.....	10,351		10,351	10,912		10,912	α 30	α 32	.....	.....
3	Dry goods and general merchandise.....	1,692	1,692	3,384	972	1,218	2,220			.....	.....
4	Hotels.....	879	2,395	3,274	3,768	δ 2,559	δ 6,207	δ 52	δ 52	.....	.....
5	Lumber and coal, retail.....	5,380		5,380	6,900		6,900	52	52	.....	.....
6	Milling and grain.....	5,380		5,380	5,340		5,348	52	52	.....	.....
7	Printing and publishing.....	4,000	200	4,200	9,786	5,225	15,005	52	52	.....	.....
8	Stock food manufactory.....				7,060		700	10	10	.....	.....
9	Wholesale grocery.....	2,210	540	2,750	3,500	900	4,400	52	52	.....	.....
	Total.....	\$ 45,158	\$ 5,017	\$ 50,175	\$ 52,790	\$ 10,114	\$ 62,904				

α Average, δ Include board and room, φ One establishment only. NUMBER WEEKS OPERATED: * 26 full, † 26 short, ‡ 30 full, 22 short.
CAUSE OF INCREASE OR REDUCTION: / Increase of business.

MUSCATINE COUNTY.

[illegible]

STATUTORY INVESTIGATION—PART I—CONTINUED.
MUSCATINE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establish- ments reporting.	AVERAGE NUMBER OF EMPLOYES DURING YEAR.			
			1899.		1900.	
			Males.	Females.	Total.	Total.
13	Lumber, sash, door and blind manufacturers.....	1	210	.....	210	260
14	Machine shop and plumbing.....	2	50	.....	53	54
15	Milling, grain and cereals.....	1	60	.....	57	114
16	Printing and publishing.....	2	21	63	123	32
17	Saddlery hardware, manufactory.....	1	43	2	26	40
18	Stone-ware manufactory.....	1	5	2	45	.....
19	Truck farming, produce commission.....	1	10	6	16	.....
20	Wholesale and retail crockery.....	1	10	.....	10	10
21	Wholesale groceries.....	3	30	2	32	21
	Total.....	37	1,711	359	2,070	1,754
	Not reported.	40	.....	.....	.....	450
						2,204

O'BRIEN COUNTY.

1	Brick manufactory.....	1	1	12	.....	13
2	Wholesale grocery.....	1	1	9	.....	10
	Total.....	2	2	21	.....	23

MUSCATINE COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.			Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING		
		1899.			1899.	1900.	1899.		
		Males.	Females.	Total.			In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)
13	Lumber, sash, door and blind manufacturer.	63,922		63,922	52	48	8 3.00		
14	Machine shop and plumbing.	25,514		25,514	52	52	9 5.00		
15	Milling grain and cereals.	c 41,223	258	c 41,223	48	50			
16	Printing and publishing.	20,370	338	20,708	52	52			
17	Saddlery hardware, manufactory.	22,306	219	22,525	52	52	10 10.00		
18	Stoneware manufactory.	1,000		1,000	30	30			
19	Truck farming, produce commission.	3,300	600	3,900	52	52			
20	Wholesale and retail crockery.	6,400		6,400	52	52	11 5.00		
21	Wholesale groceries.	\$ 22,433	493	22,926	52	52			
	Total.	\$ 580,357	\$ 50,411	\$ 630,768	52	52			

a Average. ¹¹ Not reported. ^c Separate accounts for males and females not reported. ¹² 30 full, 22 short. ¹³ 16 full, 36 short. ¹⁴ 40 full, 10 short. ¹⁵ 20 full, 22 short. ¹⁶ 27 full, 23 short. ¹⁷ 25 full, 25 short. ¹⁸ 25 full, 25 short. ¹⁹ 25 full, 25 short. ²⁰ 25 full, 25 short. ²¹ 25 full, 25 short.

O'BRIEN COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.			Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING		
		1899.			1899.	1900.	1899.		
		Males.	Females.	Total.			In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)
1	Brick manufactory.	2,000		2,000	12	52			
2	Wholesale grocery.	9,000		9,000	52	52	1 6.00		
	Total.	\$ 11,000		\$ 11,000	52	52			

CAUSE OF INCREASE OR REDUCTION: 1 Increase of business.

STATUTORY INVESTIGATION—PART I—CONTINUED.

OSCEOLA COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
			1899.		1900.	
			Males.	Females.	Males.	Females.
1	Butter, creamery.....	1	1	.....	4	.....
2	Milling, flour and grain.....	1	1	.....	.....	.....
	Total.....	1	1	6	7	4
n Not reported.						

PAGE COUNTY.

1	Brick and tile manufactory.....	2	1	34	34	18	18
2	Canning, vegetables.....	1	1	200	300	250	350
3	Coal mining.....	1	1	12	12	5	5
4	Hotel.....	1	1	1	5	2	2
5	Laundry, steam.....	1	1	2	4	2	2
6	Machine shop and foundry.....	"	2	88	94	85	97
7	Nurseries, trees and shrubs.....	2	2	11	3	12	15
8	Printing and binding.....	2	2	45	27	24	29
9	Seeds and berries.....	1	1	3	4	5	2
10	Tailoring merchant.....	1	1	.....	7	3	7
Total.....		12	12	376	497	406	535
n Not reported.							

PALO ALTO COUNTY.

[illegible]

PALO ALTO COUNTY.

[illegible]

STATUTORY INVESTIGATION—Part I—Continued.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Fence manufactory	n	1	...	4	...	7	...	2
2	Hotel, livery, etc.	1	n	...	19	...	1	...	12
3	Marble and granite monuments	1	n	...	6	...	6	...	12
4	Milling flour and grain	1	n	...	12	...	10	...	12
5	Real estate and hotel	1	1	...	5	...	5	...	3
6	Wagon manufactory	1	1	...	58	...	18	...	41
	Wagon manufactory	7	6	...	58	...	18	...	41

n Not reported.

PLYMOUTH COUNTY.

1	Clothing manufactory	1	1	1	4	6	10	3	7
2	Brick and tile works	1	1	1	15	6	15	10	10
3	Dry goods, general merchandise	1	1	1	10	6	10	12	17
4	Electric power, light and water	1	1	1	9	10	10	10	17
5	Hotel	1	1	1	5	10	15	5	15
6	Milling flour and cereals	2	2	2	66	66	66	69	70
7	Printing and binding	1	1	1	11	6	17	...	...
Total		8	7	7	120	20	149	109	129
n Not reported.									

Marginal number.	INDUSTRY OR KIND OF BUSINESS	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE* OR REDUCTION OF DAILY WAGES DURING				
		1899.		1900.		1899.	1900.	1899.		1900.		
		Males.	Females.	Total.	Males.			Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)
3	Fence manufactory	650		1,794	1,076		1,076					
4	Hotel, livery, etc.	12,000	375	12,375	10,000	350	10,350	46	41	10.00		
5	Marble and granite monuments	3,500		3,500								
6	Milling, flour and grain	3,327	2,508	7,835	4,110	1,588	5,698	52	52			
7	Real estate and hotel	2,000		2,000	1,820		1,820					
8	Wagon manufactory											
	Total	\$ 20,427	\$ 4,027	\$ 24,454	\$ 22,906	\$ 1,938	\$ 24,844					

b. Includes board and room.

PLYMOUTH COUNTY.

	\$	500	\$	1,000	\$	1,850	%	950	%	2,800	%	48	
1 Clothing manufactory	2,500												
2 Brick and tile works	3,000												
3 Dry goods, general merchandise	5,016												15.00
4 Electric power, light and water	5,280	1,818											5.00
5 Hotel	2,000	720											
6 Milling flour and cereals	33,500	1,900											3.03
7 Printing and binding	4,616	1,810											
Total	\$ 54,202	\$ 7,178	\$ 61,470	\$ 52,254	\$ 5,130	\$ 57,384							

NUMBER WEEKS OPERATED: * 40 full, 10 short, † 35 full, 15 short.
CAUSE OF INCREASE OR REDUCTION: / Demand. ‡ Efficiency of help. 3 Desire to encourage our men.
b Includes board and room.

STATUTORY INVESTIGATION—PART I—CONTINUED.
POLK COUNTY.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899	1900	1899.			1900.		
				Males.	Females.	Total.	Males.	Females.	Total.
1	Bakeries, biscuits, cakes, bread	4	4	47	20	67	68	30	98
2	Bicycles, re-ail and repairs	2	2	37	6	43	16	2	18
3	Bicycle and broom manufactory	1	1	15	5	20	8	3	11
4	Boiler manufactory	1	1	8			8		8
5	Bottling and mineral water	1	1	4	1	5	5	1	6
6	Brick and tile manufactory	3	3	230		230	138		138
7	Candy, jobbing and manufactory	3	3	30	24	54	3	2	5
8	Carriage and vehicle manufactory	3	3	97	9	106	107		107
9	Cigar manufactory	4	4	65	13	78	51	10	61
10	Clothing, retail and manufacturing	3	N	44	5	49			
11	Coal mining	11	11	808		808	926		926
12	Coffee, baking powder and spice dealers	1	1	21	9	30	22	10	32
13	Contractor, building, etc	1	N	75		75			
14	Drugs, wholesale and manufacturing	1	1	9	2	11	8	2	10
15	Dry goods and general merchandise	5	4	107	238	405	55	79	134
16	Dry good and department store	1	1	125	125	250	92	183	275
17	Electric power and lighting	1	1	55		55	55	1	52
18	Electrotyping and engraving	1	1	14		14	15		15
19	Foundry and machine shop	2	2	65	1	66	86		86
20	Furniture manufactory	1	1	20	1	21	18	1	19
21	Furniture manufacture and distribution	3	3	133	9	142	145	13	158
22	Gas, manufactory	1	1	88	2	90	68	2	100
23	Glove manufactory	1	1	25	45	70	30	55	85
24	Grease and lubricant manufactory	1	1				14	1	15
25	Groceries, retail	5	4	124	11	135	118	11	129
26	Groceries, wholesale	3	3	95	15	110	89	11	100
27	Hardware, wholesale and retail	1	N						

STATUTORY INVESTIGATION—PART I—CONTINUED.
POLK COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899	1900	1899.		1900.			
				Males.	Females.	Total.	Males.	Females.	Total.
30	Ice cutting and distribution.....	2	2	47	.....	47	15	.....	15
31	Insurance*, fire, lightning, etc.....	5	6	38	15	53	52	19	71
32	Insurance, life.....	6	4	97	20	117	76	17	93
33	Laundry, steam.....	4	2	32	70	102	10	38	38
34	Linsed cake and oil manufactory.....	1	1	24	.....	24	25	.....	25
35	Lumber, wholesale and retail.....	2	2	64	.....	64	42	42	84
36	Medicine, proprietary manufactory.....	1	1	41	71	112	47	87	134
37	Milling, flour and cereals.....	1	1	22	.....	22	.....	.....	.....
38	Monuments, marble and bronze.....	1	1	25	2	27	21	2	23
39	Nursery, trees and shrubs.....	1	1	50	3	53	50	.....	50
40	Painters, decorators and wall paper.....	1	1	73	3	76	40	.....	40
41	Paper box manufactory.....	1	1	26	16	42	.....	.....	.....
42	Peanut and coffee roaster machine manufactory.....	1	1	30	4	34	.....	.....	.....
43	Planing mill, wood fixture manufactory.....	3	4	70	.....	70	74	.....	74
44	Plumbing and steam fitting.....	3	3	37	.....	37	46	1	47
45	Printing and publishing.....	9	9	380	50	430	346	109	455
46	Pump, windmill and scale manufactory.....	3	3	74	1	75	95	2	97
47	Seeds, wholesale and retail.....	1	1	15	15	30	.....	.....	.....
48	Shoes, retail.....	1	1	23	4	27	25	6	31
49	Soap manufactory.....	1	1	12	3	15	12	3	15
50	Starch manufactory.....	1	1	186	42	228	192	44	236
51	Street railway.....	1	1	251	.....	251	.....	.....	.....
52	Suspenders manufactory.....	1	1	45	37	82	.....	.....	.....
53	Telephone exchange (local).....	1	1	.....	.....	.....	21	42	63
54	Tent and awning manufactory.....	1	1	13	8	21	13	7	20
55	Transfer, storage and express.....	4	4	103	4	107	58	1	59
56	Trunk and bag manufactory.....	1	1	167	9	176	6	.....	6
57	Typewriter manufactory.....	1	1	18	10	28	201	16	217
58	Vinegar and pickle manufactory.....	1	1	14	.....	14	14	.....	14

STATUTORY INVESTIGATION—PART I—CONTINUED.

POLK COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.							
		Number establishments reporting.		1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
60	Wholesale boots and shoes.....	1	1	26	2	28	30	2	32
61	Wholesale butter and eggs.....	1	1	8		8			15
62	Wholesale and retail china and crockery.....	1	1	8		8	15		15
63	Wholesale dry goods and notions.....	1	1				6		11
64	Wholesale and retail dental supplies.....	1	1				8	3	11
65	Wholesale furnishing goods.....	1	1	12	1	13	11		33
66	Wholesale fruits and produce.....	1	1	35		35	33		9
67	Wholesale and retail hardware.....	1	1	26		26	8	1	
68	Wholesale meats and provisions.....	1	1	8		8			
69	Wholesale millinery.....	2	1	50	80	130	40	185	225
70	Wholesale oils.....	1	1	30		30	22		21
71	Wholesale paper and wooden ware.....	1	1	15	2	17	30	1	40
72	Whole ale wagons and farm implements.....	1	2	24	4	28	34	6	115
73	Woolen goods manufactory.....	1	1	44	52	96	55	60	
	Total.....	153	135	4,860	1,230	6,090	4,178	1,259	5,437

POTTAWATTAMIE COUNTY.

1	Agricultural implement manufactory.....	1	1	14		14	9	18	186
2	Agricultural implements, sales agencies.....	12	11	102	25	217	108	47	
3	Brick and tile works.....	3	3	56		56	47		

STATUTORY INVESTIGATION—PART I—CONTINUED.
POTTAWATTAMIE COUNTY—CONTINUED.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
4	Buggy and carriage manufactory	1	1	58	6	64	62	7	69
5	Clear logging and manufactory	1	1	8	.....	8	9	.....	9
6	Dry goods and millinery	1	1	7	15	22	.....	.....	.....
7	Dyeing and cleaning	1	1	4	5	9	2	3	5
8	Electric power, light and heat	1	1	17	.....	17	17	.....	17
9	Furniture, carpets, hardware, retail	3	2	24	32	56	27	18	45
10	Hotels	3	2	45	.....	45	10	.....	10
11	Lumber and wood, retail	1	1	18	74	92	19	70	89
12	Laundry, steam	3	3	18	.....	18	.....	.....	.....
13	Lumber, whole sale	1	1	18	.....	18	18	.....	18
14	Milling, flour and grain	2	2	25	.....	25	10	.....	10
15	Oils and grease manufactory	1	1	10	.....	10	10	.....	10
16	Printing, de orating and wall paper	1	1	.....	.....	.....	17	5	22
17	Pickles, vinegar and jelly manufactory	1	1	.....	.....	.....	31	1	32
18	Plumbing and steam fitting	1	1	40	4	44	50	10	60
19	Printing and publishing	3	3	30	.....	30	5	.....	5
20	Sash, doors and blind manufactory	1	1	28	1	29	8	1	9
21	Saw and weighing machine manufactory	1	1	20	.....	20	28	3	31
22	Sealing and garments	1	1	14	.....	14	16	.....	16
23	Sewing and storage	1	1	17	.....	17	30	.....	30
24	Water works	1	1	14	.....	14	35	.....	35
25	Wholesale drugs	1	1	49	1	50	33	.....	33
26	Wholesale groceries	2	2	47	2	49	51	2	53
27	Wholesale hardware	1	1	17	.....	17	18	.....	18
28	Wholesale potteryware	1	1	23	2	25	21	3	24
	Total	40	46	769	170	939	704	141	845

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	1899.			1900.			1899.		1900.		number of weeks in operation.
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)	
1	Buggy and carriage-manufacture	19,327	1,362	20,689	19,950	2,650	22,600	50	50	50	50	50
2	Carpentering and millinery	1,820	820	2,640	3,500	.....	3,500	52	52	52	52	52
3	Dry goods and millinery	3,370	2,720	6,090	.....	.....	.....	.....	.....	.....	.....	.....
4	Dyeing and cleaning	1,250	1,635	2,885	.....	812	1,748	52	52	52	52	52
5	Electric power, light and heat	12,512	3,375	15,887	12,071	.....	12,071	52	52	52	52	52
6	Furniture, carpets, hardware, retail	16,228	840	17,068	16,500	.....	16,500	52	52	52	52	52
7	Hotels	10,600	8,232	18,832	7,860	5,736	13,596	52	52	52	52	52
8	Ice and wood, retail	4,663	4,663	9,326	4,288	.....	4,288	52	52	52	52	52
9	Laundry, steam	9,570	18,150	27,720	10,150	18,500	28,650	52	52	52	52	52
10	Lumber, wholesale	4,070	.....	4,070	13,700	.....	13,700	50	50	50	50	50
11	Milling, flour and feed	13,325	.....	13,325	13,700	.....	13,700	50	50	50	50	50
12	Oils and grease manufactory	15,528	.....	15,528	3,500	.....	3,500	52	52	52	52	52
13	Painting, decorating and wall paper	6,000	.....	6,000	8,000	.....	8,000	52	52	52	52	52
14	Pickles, vinegar and jelly manufactory	.....	.....	.....	8,000	1,000	9,000	52	52	52	52	52
15	Printing and book-binding	11,565	.....	11,565	16,333	490	16,823	52	52	52	52	52
16	Printing and publishing	31,000	1,000	32,000	.....	.....	.....	52	52	52	52	52
17	Sash, doors and blind manufactory	1,200	.....	1,200	15,000	.....	15,000	52	52	52	52	52
18	Scale and weighing machine manufactory	15,000	300	15,300	.....	.....	.....	52	52	52	52	52
19	Tailoring and garments	7,000	.....	7,000	4,361	304	4,665	52	52	52	52	52
20	Transfer and storage	8,430	.....	8,430	12,003	1,360	13,363	52	52	52	52	52
21	Water works	20,000	300	20,300	22,000	.....	22,000	52	52	52	52	52
22	Wholesale drugs	35,500	360	35,860	30,600	500	31,100	52	52	52	52	52
23	Wholesale grocers	10,500	.....	10,500	13,500	.....	13,500	52	52	52	52	52
24	Wholesale hardware	11,000	900	11,900	11,917	93	12,817	52	52	52	52	52
25	Whole sale potteryware	.....	.....	.....	.....	.....	.....	52	52	52	52	52
26	Total	\$ 167,404	\$ 48,167	\$ 215,571	\$ 301,674	\$ 42,146	\$ 343,820	52	52	52	52	52

a Average. b Includes board and room. c Se arate account for males and females not reported. d One establishment only.
 NUMBER OF WEEKS OPERATED: * 35 full, 15 short. + 17 full, 32 short. \$ 32 full, 22 short. || 30 full, 22 short. ¶ 32 full, 20 short.
 ** 40 full, 10 short.
 CAUSE OF INCREASE OR REDUCTION: 1 Demand for and by labor. 2 Four establishments better business. 3 More business. 4 Demand for labor.
 5 Union. 6 Better business, men demanded it. 7 Better times. 8 Higher wages demanded. 9 Efficiency and length of service. 10 Men joined plumbers
 union. 11 Better business, men demanded it. 12 Better times. 13 Wages are tending upward. 14 More business.

STATUTORY INVESTIGATION—PART I—CONTINUED.
POWESHIEK COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Brick and tile works	2	#	12	5	12	155	5	160
2	Carriage and wagon manufactory	1	1	145	32	150	25	32	57
3	Contractor and builder	1	1	4	10	14	7	45	52
4	Dry goods and general mer handise.	2	2	52	40	92	47	45	92
5	Glove and mitten manufactory	1	1	6	6	12	6	6	12
6	Hardware, retail, and plumbing	1	1	9	20	29	4	8	12
7	Hotels	3	1	7	7	14	2	5	7
8	Laundry, steam	#	1	2	6	8	10	4	14
9	Meat market and exchange of stock	1	1	6	1	7	10	4	14
10	Printing, binding and publishing	1	1	9	1	10	10	4	14
11	Wholesale butter and eggs	1	#	9	1	10	10	4	14
	Total	14	10	282	82	364	261	74	335

Not reported.

SAC COUNTY.

		#	1	.....	.....	.....	.....	.....	.....
1	Canning	.....	1	.....	.....	.....	.....	.....	.....
2	Farming and stock raising	2	2	160	22	182	200	150	350
3	Wholesale produce	1	1	5	5	10	185	2	187
Total		3	4	165	22	187	396	152	548

Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
1	Brick and tile works.....	\$ 2,700	.....	\$ 2,700	\$ 78,817	\$ 1,785	\$ 80,633	.....	.....	.....	.....
2	Carriage and wagon manufactory.....	74,605	.....	76,305	.....	.....	.....	.....	.....	.....	.....
3	Contract r and builder.....	13,500	.....	13,500	9,435	.....	9,435	.....	.....	.....	.....
4	Dry goods and general merchandise.....	2, 63	3,876	6,036	2,510	3,850	6,360	.....	.....	.....	.....
5	Glove and mitten manufactory.....	32,608	9,451	42,059	21,960	13,460	35,420	.....	.....	.....	.....
6	Hardware, retail, and plumbing.....	3,500	.....	3,500	3,922	.....	3,922	.....	.....	.....	.....
7	Hotels.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	Laundry, steam.....	.....	.....	.....	1,320	.....	2,570	.....	.....	.....	.....
9	Meat market and exchange of stock.....	3,328	.....	3,328	720	1,250	2,350	.....	.....	.....	.....
10	Printing, binding and publishing.....	3,500	1,600	5,100	3,900	.....	3,900	.....	.....	.....	.....
11	Wholesale butter and eggs.....	1,093	215	1,308	3,000	1,600	4,600	.....	.....	.....	.....
	Total.....	\$ 136,004	\$ 16,842	\$ 160,146	\$ 125,614	\$ 23,576	\$ 149,190	.....	.....	.....	.....

Includes board and room. ^a Separate accounts for males and females not reported. ^b 35 full, 17 short. ^c 36 full, 10 short. ^d 6 full, 40 short. ^e 36 full, 14 short. ^f 40 full, 12 short. ^g Demand for labor.

SAC COUNTY.

1	Canning.....	.....	.....	.....	\$ 6,000	\$ 2,000	\$ 8,000	.....	.....	.....	.....
2	Farming and stock raising.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Wholesale produce.....	1,040	.....	\$ 32,494	.....	.....	42,381	.....	.....	.....	.....
	Total.....	\$ 1,040	.....	\$ 32,534	\$ 9,581	\$ 2,000	\$ 54,012	.....	.....	.....	.....

NUMBER WEEKS OPERATED: * 40 full, 10 short. [†] 37 full, 15 short. [‡] Includes board and room. [§] Separate accounts for males and females not reported.

STATUTORY INVESTIGATION—PART I—CONTINUED.
SCOTT COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
		1899.			1900.				
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Agricultural implement, sales agencies	1	1	6	.....	6	.....	6	6
2	Agricultural implement manufactory	1	1	97	.....	97	.....	60	60
3	Axles and brake beam manufactory	1	1	15	.....	15	.....	122	123
4	Bread bakery	1	1	66	.....	66	.....	44	44
5	Brick and tile works	1	1	32	.....	32	.....	.....	.....
6	Broom and duster manufactory	1	1	15	.....	15	.....	.....	.....
7	Button (pearl) manufactory	1	1	89	.....	89	.....	.....	.....
8	Button (pearl) manufactory	2	2	94	.....	94	.....	.....	.....
9	Candy and cracker manufactory	1	1	108	.....	108	.....	.....	.....
10	Canning and manufactory cans	5	5	126	.....	126	.....	.....	.....
11	Cigar manufactory	1	1	14	.....	14	.....	.....	.....
12	Cigar box manufactory	1	1	20	.....	20	.....	.....	.....
13	Coal mining	1	1	16	.....	16	.....	.....	.....
14	Coffee roasting and baking powder manufactory	1	1	13	.....	13	.....	.....	.....
15	Construction and contracting	1	2	.....	.....	.....	.....	.....	.....
16	Coopering kegs and barrel manufactory	1	4	187	.....	187	.....	.....	.....
17	Department stores, general merchandise	1	1	354	.....	354	.....	.....	.....
18	Furniture manufactory	1	1	48	.....	48	.....	.....	.....
19	Furniture and carpets, retail	2	2	59	.....	59	.....	.....	.....
20	Grain and commission	1	1	57	.....	57	.....	.....	.....
21	Groceries, retail	1	1	53	.....	53	.....	.....	.....
22	Groceries, wholesale	1	1	55	.....	55	.....	.....	.....
23	Heavy hardware and merchant iron, wholesale	1	1	52	.....	52	.....	.....	.....
24	Hotels	1	1	78	.....	78	.....	.....	.....
25	Insurance, life	1	1	36	.....	36	.....	.....	.....
26	Laundry, steam	1	1	40	.....	40	.....	.....	.....
27	Livery	1	1	16	.....	16	.....	.....	.....
28	Lumber and planing mills	1	1	455	.....	455	.....	.....	.....
29	Macaroni manufactory	1	1	.....	.....	.....	.....	.....	.....

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING					
		1899.		1900.		1899.		1900.			
		Males	Females	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
1	Agricultural implement, sales agencies	\$ 2,600		\$ 2,600	\$ 3,125		\$ 3,125	52			
2	Agricultural implement manufactory				15,000		15,000	52			
3	Axles and brake beam manufactory	c		c 55,640	62,000		62,520	52			
4	Bread bakery	6,400	\$ 440	6,840		520		52			
5	Brick and tile works	20,319		20,319	10,878		10,878	25	3.00		
6	Broom duster manufactory	11,763	1,251	13,014				30		15.0	d
7	Button (pearl) manufactory	1,200	960	2,160				51			
8	Button (pearl) manufactory	33,018	21,058	54,076	44,000	30,000	74,000	48			
9	Candy and cracker manufactory	54,268	14,970	69,238	\$ 24,916	\$ 8,811	\$ 33,727	52			
10	Canning and manufacturing cans.	5,800	2,170	7,970	19,680	8,500	28,160	6			
11	Cigar box manufactory	c		c149,701		c	121,096	52			
12	Coal mining	6,000	5,800	11,800	5,980	5,840	11,820	50			
13	Coffee roasting and baking powder manufactory	28,034	3,616	31,650	3,517		3,517	26	2.00		
14	Construction and contracting	48,320		48,320	20,555	3,660	33,215	52			
15	Coopering kegs and barrel manufactory	3,511		3,511	63,073		63,073	52	15.00		
16	Department stores, general merchandise	90,855	53,384	144,239	6,508		6,508	52			
17	Furniture manufactory	15,175		15,175	92,005	53,629	145,634	52	8.10		
18	Furniture and carpets, retail	7,350	574	7,924	13,843		13,843	52			
19	Grain and commission	32,467	1,436	33,903	710		14,603	52	10.00		
20	Groceries, retail				35,201	1,000	36,204	52		10.0	10
21	Groceries, wholesale	43,211	546	43,757	312		3,812	52			
22	Heavy hardware and merchant iron, wholesale	17,582		17,582	41,607	538	44,115	52			
23	Hotels	6,210	6,7615	12,975	21,028		21,028	52	17.3.00		
24	Insurance, life	41,653		41,653	6,561	6,561	6,561	52		12.0	16.0
25	Laundry, steam	7,616	10,639	18,255	17,248		17,248	52			
26	Livery	3,000		3,000	3,500		3,500	52			
27	Lumber and planing mills	174,953		174,953	179,735		179,735	52			
28	Macaroni manufactory	c		c 17,463			18,140	52			

STATUTORY INVESTIGATION—PART I—CONTINUED.
SCOTT COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establish- ments reporting.		AVERAGE NUMBER OF EMPLOYES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
30	Machine shop and foundry.....	1	1	70	.....	70	75	.....	75
31	Melting and brewing.....	1	1	11	.....	11	11	.....	11
32	Merchant tailoring.....	1	1	16	.....	16	12	2	14
33	Milling flour and cereals.....	2	1	33	.....	33	26	.....	26
34	Moravians marble and granite.....	3	2	33	.....	33	34	.....	34
35	Monuments marble and granite.....	1	1	32	.....	32	34	.....	34
36	Overalls, shirts and pants manufactory.....	2	2	52	.....	104	14	.....	14
37	Packing meats and provisions.....	1	1	40	.....	40	46	130	176
38	Paint manufactory.....	1	1	.....	.....	.....	.....	.....	.....
39	Paper dealers and box manufactory.....	1	1	2	.....	2	30	10	40
40	Plumbing and heating supplies.....	1	1	20	.....	20	.....	.....	.....
41	Printing, binding and publishing.....	6	1	137	.....	137	24	.....	24
42	Pump and well supply manufactory.....	1	1	25	.....	25	15	.....	15
43	Saddlery manufactory.....	1	1	35	.....	35	35	.....	35
44	Shoe, doetail.....	2	1	11	.....	11	.....	.....	.....
45	Shoes, wholesale.....	1	1	5	.....	5	.....	.....	.....
46	Snow case manufactory.....	1	1	4	.....	4	.....	.....	.....
47	Soda manufactory.....	1	1	270	.....	270	334	.....	334
48	Sugar millway.....	1	1	308	.....	308	.....	.....	.....
49	Sugar and syrup manufactory.....	1	1	.....	.....	.....	.....	.....	.....
50	Telephone service (covering all branches in state, see miscellaneous tables).....	1	1	.....	.....	.....	.....	.....	.....
51	Transfer and expressing.....	1	1	15	.....	15	.....	.....	.....
52	Vinegar and pickle manufactory.....	1	1	77	.....	77	28	9	37
53	Washing machine manufactory.....	1	1	15	.....	15	.....	.....	.....
54	Water supply.....	1	1	316	.....	316	20	.....	20
55	Wheel (iron) manufactory.....	1	1	.....	.....	.....	.....	.....	.....
56	Wholesale crockery and glassware.....	1	1	.....	.....	.....	.....	.....	.....
57	Wholesale fruits and produce.....	2	2	23	.....	23	20	6	26
58	Wholesale hardware.....	1	1	17	.....	17	18	3	21
59	Wholesale poultry, butter and eggs.....	1	1	20	.....	20	22	3	25

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	Increase (per cent.)	Reduction (per cent.)
30	Machine shop and foundry.....	36,664		36,664	38,230		38,230	52	52
31	Malting and brewing.....	8,092		8,092	8,294		8,294	52	52
32	Merchant tailoring.....	4,000	600	4,600	5,100	840	6,000	52	52
33	Milling, flour and cereals.....	19,358	625	19,983	13,864	600	14,464	52	52
34	Monuments, marble and granite.....	7,442		7,442	7,700		7,700	52	52
35	Overalls shirts and pants manufactory.....	16,946	21,296	38,242	17,495	21,648	39,073	52	52
36	Packing, meats and provisions.....	19,000		19,000	7,466	2,222	9,688	52	50
37	Paint manufactory.....								
38	Paper dealers and box manufactory.....								
39	Plumbing and heating supplies.....	10,221		10,221	9,000		9,300	52	52
40	Printing, binding and publishing.....	75,216	5,035	80,251	53,386	2,860	56,246	52	52
41	Pump and well supply manufactory.....	12,000		12,000	12,000		12,000	52	52
42	Saddlery manufactory.....	13,000		13,000	13,500		13,500	52	52
43	Sash, door and blind manufactory.....	20,025		20,025	34,189		34,189	52	52
44	Shoes, retail.....	6,502	2,694	9,196	3,072	255	3,327	52	52
45	Shoes, wholesale.....	3,625	105	3,730	3,700		3,700	52	52
46	Shoe case manufactory.....	3,000		3,000	3,700		3,700	52	52
47	Soap manufactory.....	900		900				52	52
48	Street railway.....	116,613		116,613	142,347		142,347	52	52
49	Sugar and syrup manufactory.....	101,166	2,156	103,321				52	52
50	Telephone service (see miscellaneous table)							52	52
51	Transfer and express.....	10,500		10,500				52	52
52	Vinegar and pickle manufactory.....	29,068	1,100	30,168	37,148		37,148	52	52
53	Washing machine manufactory.....	15,940		15,940	27,223		27,223	52	52
54	Water supply.....	145,159		145,159	127,777		127,777	52	52
55	Wheel (iron) manufactory.....	13,800	2,095	15,895	14,668	2,260	16,928	52	52
56	Wholesale crockery and glassware.....	12,798	1,000	13,798	14,555	1,616	16,171	52	52
57	Wholesale fruits and produce.....	21,131	1,440	22,571	19,220	1,440	20,660	52	52
58	Wholesale hardware.....	10,400		10,400				52	52
59	Wholesale poultry, butter and eggs.....							52	52

STATUTORY INVESTIGATION—PART I—CONTINUED.
SCOTT COUNTY--CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number estab- lish- ments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
			1899.		1900.	
			1899	1900	Males.	Females. Total.
60	Window and plate glass b'ellers.....	1	1	60	66	.....
61	Woolen goods manufactory.....	1	1	30	84	.....
	Total.....	94	76	3,392	1,250	4,642
	Total.....					
	Not Reported.					
					2,927	1,077
						4,004

SIoux COUNTY.

1	Milling, flour and cereals.....	1	1	15	15	17	17
2	Hotel.....	1	1	1	4	5	.....
	Total.....	2	1	16	4	20	17
	Not reported.						

STORY COUNTY.

1	Brick and tile works.....	1	1	4	4	5	5
2	Dry goods and general merchandise.....	1	1	2	4	6	.....
3	Restaurant.....	1	1	10	10	8	8
4	Wholesale produce.....	1	1	14	14	14	14
	Total.....	4	3	30	4	34	27
	Not reported.						

Marginal number	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				AVERAGE OF REDUCTION OF DAILY WAGES DURING—			
		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	1899.	1900.
60	Window and plate glass bevellers.....	24,000	10,021	34,021	18,036	12,576	30,612	52	52
61	Woolen goods manufactory.....	15,632	10,021	25,653	18,036	12,576	30,612	52	52
	Total.....	39,632	20,042	59,674	36,072	25,152	61,224	52	52

SIOUX COUNTY.

1	Milling, flour and cereals.....	\$ 7,351	\$ 7,351	\$ 8,306	\$ 8,306	\$ 8,306	\$ 8,306	30	52	10.00
2	Hotel.....	60	575	635	635	635	635	52	52	10.00
	Total.....	\$ 7,411	\$ 575	\$ 7,986	\$ 8,306	\$ 8,306	\$ 8,306	30	52	10.00

Includes board and room.

CAUSE OF INCREASE OR REDUCTION: / Good business.

STORY COUNTY.

1	Brick and tile works.....	\$ 350	\$ 350	\$ 880	\$ 880	\$ 880	\$ 880	20	20	75.00
2	Dry goods and general merchandise.....	3,600	1,750	5,350	3,600	3,600	3,600	52	52	52
3	Restaurant.....	7,000	7,000	7,000	7,000	7,000	7,000	52	52	52
4	Wholesale produce.....	10,950	12,700	23,650	11,980	11,980	11,980	52	52	52
	Total.....	\$ 10,950	\$ 12,700	\$ 23,650	\$ 11,980	\$ 11,980	\$ 11,980	52	52	52

Includes board and room included. c Separate accounts for males and females, not reported.

CAUSE OF INCREASE OR REDUCTION: / Retailing works.

NUMBER WEEKS OPERATED: * 36 full, 16 short. † 40 full, 22 short. ‡ 40 full 12 short.

STATUTORY INVESTIGATION—PART I—CONTINUED.

TAMA COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number estab- lish- ments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
			1899.		1900.	
			Males.	Females.	Total.	Total.
1	Brick and tile works	3	42	.....	42	39
2	Broom manufactory and milling	1	10	.....	10	3
3	Egg case and straw board manufactory	1	65	40	105	.....
4	Hotels and restaurants	2	4	8	12	.....
5	Machine shop, repairing	1	19	1	20	.....
	Total	8	140	49	189	42
	n Not reported.	4	.....	.....	.....	.....

TAYLOR COUNTY.

1	Bak and creamery	1	1	.....	1	2
2	Brick and tile work	1	1	.....	1	11
3	Contracting, building, etc	1	1	.....	1	9
4	Coal mining	3	78	.....	78	18
5	Hotel	1	3	3	6	3
6	Printing and binding	1	0	1	1	6
	Total	8	103	4	107	46
	n Not reported.	5	.....	.....	.....	.....

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
1	Brick and tile works	\$ 11,940		\$ 11,940	\$ 13,461		\$ 13,461			102.00	
2	Broom manufactory and milling	4,230		4,200							
3	Egg case and straw board manufactory	22,628	6,920	28,557				210.00			
4	Hotels and restaurants	6 980	6 2,280	6 3,260							
5	Machine shop, repairing	3,500	64	3,564							
	Total	\$ 43,218	\$ 9,273	\$ 51,521	\$ 14,361		\$ 14,361				

6 Includes room and board. 7 One establishment only. 8 Includes board and room. 9 Separate accounts for males and females not reported. 10 Demand for brick better. 11 Prosperity. 12 Short.

TAYLOR COUNTY.

1	Bank and creamery	\$ 2,740		\$ 2,710	\$ 1,000		\$ 1,000				
2	Brick and tile works	3,000		3,000	3,000		3,000				
3	Contracting, building, etc.	700		700	1,539		1,539				
4	Coal mining	23,278		23,278	7,000		7,000				
5	Hotel	c		c	6 550	6 500	6 1,050				
6	Printing and binding	c		c	2,980						
	Total	\$ 29,718		\$ 31,670	\$ 13,149	\$ 500	\$ 13,149				

6 Includes board and room. 7 Separate accounts for males and females not reported. 8 Demand for brick. 9 More building. 10 Cold weather.

STATUTORY INVESTIGATION—PART I—CONTINUED.

UNION COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYES DURING YEAR.					
				1899.			1900.		
				1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Electric power and lighting.....	1	1	6	6	6	7	7	7
2	Furniture, caskets and undertaking....	1	1	5	5	5	5	5	5
3	Hotels and restaurants.....	6	3	21	37	58	18	19	37
4	Laundry, steam.....	1	1	3	3	6	3	3	6
5	Printing and publishing.....	2	2	18	3	21	10	4	14
	Total.....	11	8	53	43	96	43	26	69

VAN BUREN COUNTY.

1	Canning and pickling manufactory.....	1	1	40	70	110	17	5	22
2	Cigar manufactory.....	1	2	31	7	38	20	5	25
3	Coal mining.....	1	1	14	16	30	1	5	6
4	Hotels.....	1	1	1	5	6	1	5	6
5	Foot handle manufactory.....	1	1	29	38	67	32	48	80
6	Woolen goods manufactory.....	1	1	29	38	67	32	48	80
	Total.....	5	6	115	120	235	75	58	133

n Not reported.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.	1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
1	Electric power and lighting.....	\$ 3,200		\$ 3,200	\$ 3,852		\$ 3,852			7	10.00
2	Furniture, caskets and undertaking	2,600		2,600	3,000		3,000				
3	Hotels and restaurants	3,328	6 6,150	9,478	6 4,380	6 3,034	7,414				2 5 00
4	Laundry, steam.....	900	650	1,550	1,220	550	1,770				
5	Printing and publishing.....	4,587	564	5,151	4,550	924	5,474				
	Total	\$ 11,805	\$ 7,764	\$ 22,569	\$ 17,042	\$ 4,508	\$ 21,550				

6 Includes board and room.

CAUSE OF INCREASE OR REDUCTION: 1 Better grade of help. 2 Business no good.

VAN BUREN COUNTY.

1	Canning and pickling manufactory	\$ 2,500	\$ 1,000	\$ 3,500	\$ 7,408	\$ 5,110	\$ 793	\$ 5,903	46		
2	Cigar manufactory.....	6,948	410	7,408	6,313	20	6,313	6,313	48		
3	Coal mining.....	4,213		4,210	6,313	6	1,000	6,313	50		
4	Hotel.....	180	900	1,080	6 20	6 1,000	6 1,200	6 1,200	32		
5	Tool handle manufactory.....	10,098	5,049	15,147	10,918		5,673	16,160	29		
6	Woolen goods manufactory							16,160	52		
	Total	\$ 24,016	\$ 7,359	\$ 31,375	\$ 23,701	\$ 7,466	\$ 31,167				

61 Includes board and room.

NUMBER WEEKS OPERATED—* 8 full, 32 short.

CAUSE OF INCREASE OR REDUCTION—1 General prosperity.

STATUTORY INVESTIGATION—PART I—CONTINUED,
WAPELLO COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establish- ments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.			
				1899.		1900.	
		1899	1900	Males.	Females.	Total.	Total.
1	Bridge and structural iron works	1	1	32		32	25
2	Candy and cracker manufactory	1	1	20	20	40	35
	Cigar and tobacco manufactory	1	1	6	27	33	40
	Cigar manufactory and pipe jobbers	1	1	15	6	21	20
3	Cigar manufactory	1	1	9	17	26	18
	Cigar manufactory	1	1	12	18	30	30
	Cigar manufactory	1	1	20	10	30	15
	Cigar manufactory	1	1	8		8	12
4	Clothing and furnishing goods	1	1	443	1	444	514
5	Coal mining	6	8	41	64	105	31
6	Dry goods and general merchandise	3	2	50		50	65
7	Electric power, light and heat	1	1				162
8	Foundry and machine shops	1	2				8
9	Hardware, retail	1	1	4	4	8	40
10	Hardware, wholesale	1	1	46	3	49	6
11	Hides, tallow and wool	1	1	39	3	42	36
12	Hotels and restaurants	5	5	35	37	72	30
13	Ice, cutting and retailing	2	2	25		25	25
14	Laundry, steam	2	2	33	55	88	62
15	Miners tools and supply manufactory	2	2	38	15	53	32
16	Pickle and vinegar manufactory	1	1	5	5	10	5
17	Pork packing	1	1	1,000		1,000	1,100
18	Poultry raising and selling	1	1	20	10	30	19
19	Printing and publishing	1	1	27	4	31	34
20	Transfer, livery and express	1	1	39		39	52
21	Water supply	1	2	10	1	11	11
22	Wholesale beer, bottlers	1	1	14		14	9

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				AVERAGE number of weeks in operation.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.		1899.		1900.		1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	1899.	1900.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
1	Bridge and structural iron works.....	\$ 14,500	...	\$ 14,500	\$ 12,102	...	\$ 12,102	52	1152	...	...	...	...
2	Candy and cracker manufactory.....	8,000	3,500	11,500	7,000	2,250	9,250	45	8850	6.00	...	...	...
3	Cigar manufactory and pipe jobbers.....	6,937	926	7,863	5,991	9,000	16,000	40	45	15.00	...	...	...
4	Cigar manufactory.....	5,188	995	6,183	5,991	1,421	7,412	50	50	...	...	...	...
5	Cigar manufactory.....	2,900	3,100	6,000	2,800	1,555	4,355	49	52	...	...	...	...
6	Cigar manufactory.....	12,040	7,040	19,080	8,100	3,100	11,200	50	50	...	...	...	...
7	Clothing and furnishing goods.....	4,910	...	4,910	9,000	12,750	21,750	52	50	...	10.00	...	...
8	Coal mining.....	215,587	420	215,587	254,693	...	254,693	52	52	4 12 5	...	...	...
9	Dry goods and general merchandise.....	16,756	30,908	47,664	12,175	11,663	23,838	40	40	5 12 5	...	6 12 5	...
10	Electric power, light and heat.....	23,833	...	23,833	24,854	...	24,854	52	52	7 05.00	...	...	...
11	Foundry and machine shops.....	...	...	...	76,40	1,200	77,600	52	52	...	...	...	...
12	Hardware, retail.....	1,550	937	2,487	30,050	1,210	31,260	52	52	...	...	8 0 7.00	...
13	Hides, tallow and wool.....	20,694	1,206	21,900	4,341	712	5,053	52	52	9 10.00	...	...	...
14	Hotels and restaurants.....	9,444	6 7,553	16,997	6 12,365	9,004	21,369	52	52	10 10.00	...	...	...
15	Ice, cutting and retailing.....	5,200	...	5,200	7,106	...	7,106	852	52	...	...	...	...
16	Laundry, steam.....	11,360	12,216	23,576	13,183	13,295	26,478	52	52	...	...	11 7.00	...
17	Miners tools and supply manufactory.....	2,000	600	2,600	2,300	200	2,500	16	12	...	...	...	...
18	Pickle and vinegar manufactory.....	383,000	...	383,000	357,000	...	357,000	1152	1152	12 7.50	...	...	...
19	Pork packing.....	3,816	1,008	4,824	3,564	623	4,187	52	52	...	...	...	...
20	Poultry, raising and selling.....	17,217	1,794	19,011	26,155	1,500	27,655	52	52	13 12.5	...	...	...
21	Printing and publishing.....	17,914	...	17,914	22,581	...	22,581	52	52	...	...	...	...
22	Transfer, livery and express.....	6,300	600	6,900	7,990	600	8,590	52	52	...	...	...	...
23	Water supply.....	3,866	...	3,866	3,060	...	3,060	52	52	...	...	14 50.00	...
24	Wholesale beer bottlers.....	...	...	...	...	...	...	52	52	...	...	...	...

STATUTORY INVESTIGATION—PART I—CONTINUED.

WAPELLO COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
23	Wholesale butter and eggs.....	2	2	21	.....	21	17	.....	17
24	Wholesale drugs, paints and glass.....	1	1	22	2	24	26	2	28
25	Wholesale groceries.....	2	2	33	2	35	31	3	34
	Total.....	44	48	2,017	293	2,310	2,348	312	2,660
n Not reported.									

WARREN COUNTY.

1	Coal mining.....	5	4	63	.....	63	43	.....	43
2	Dry goods, general merchandise.....	1	1	3	2	5	3	3	6
3	Hotel.....	1	n	2	.....	5	.....	.....	.....
	Total.....	7	5	66	4	73	46	3	49
n Not reported.									

WASHINGTON COUNTY.

1	Brick and tile works.....	1	1	18	.....	18	13	.....	13
2	Carriage and buggy manufactory.....	1	1	10	.....	10	15	.....	15
3	Hotel.....	1	n	5	11	16	.....	.....	.....
4	Printing and binding.....	1	1	7	1	8	7	.....	7
5	Rock quarrying.....	1	1	5	.....	5	6	.....	6
	Total.....	5	4	45	12	57	41	.....	41

DAILY WAGES DURING

number of

TOTAL WAGES PAID DURING YEAR.

Marginal number.

INDUSTRY OR KIND OF BUSINESS.	1899.			1900.			In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)
	Males.	Females.	Total.	Males.	Females.	Total.				
23 Wholesale butter and eggs.....	8,473	.....	8,473	8,200	.....	8,200	..	..	..	..
24 Wholesale drugs, paints and glass.	20,000	800	20,800	16,544	800	17,344	..	..	..	..
25 Wholesale groceries.....	20,700	900	21,600	20,402	1,800	22,202	..	..	..	..
Total.....	\$85,185	\$ 75,493	\$61,348	\$950,605	\$ 75,761	\$1,055,582	..	..	..	..

^a Average. ^b Includes board and room. ^c Separate accounts for males and females not reported. ^d One establishment only.
 NUMBER WEEKS OPERATED: * 38 full, 12 short. † 40 full, 8 short. ‡ 40 full, 40 short. § 12 full, 40 short. || 25 full, 27 short. ¶ 36 full, 16 short. ** 36 full, 16 short. †† 30 full, 32 short. ‡‡ 30 full, 12 short. §§ 40 full, 12 short. ||| 16 full, 36 short. ¶¶ 12 full, 40 short.

CAUSE OF INCREASE OR REDUCTION: † Increase of business. ‡ To keep help from striking. § Prosperity. ¶ Encouragement to old employees. § Organization of miners. ^b Agreement with miners. ^d More business, higher wages. ^e More business. ^f Increase in two houses, account of good business. ^g Demand for labor. ^h Better business. ⁱ Nine hour day adopted at 10 hour rate. ^j Employees struck.

WARREN COUNTY.

1 Coal mining.....	\$ 12,552	.....	\$ 12,552	\$ 13,083	.....	\$ 13,083	30	36	.....	12.5
2 Dry goods, general merchandise.....	1,600	\$ 700	2,300	1,600	800	2,400	.....	52	.....	10.0
3 Hotel.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	\$ 14,152	\$ 700	\$ 15,737	\$ 14,683	\$ 800	\$ 15,483	.....	.....	.....	.....

^b Includes board and room. ^c Separate accounts for males and females, not reported.

WASHINGTON COUNTY.

1 Brick and tile works.....	\$ 4,380	.....	\$ 4,380	\$ 3,600	.....	\$ 3,600	26	30	.....	.....
2 Carriage and buggy manufactory.....	4,530	.....	4,530	5,882	.....	5,882	* 52	52	.....	10.00
3 Hotel.....	6	.....	6	2,856	.....	2,856	.....	.....	.....	.....
4 Printing and binding.....	3,120	.....	3,120	1,600	.....	1,600	52	30	.....	.....
5 Rock quarrying.....	600	.....	600	2,500	.....	2,500	20	36	.....	.....
Total.....	\$ 13,590	\$ 1,866	\$ 15,486	\$ 13,582	.....	\$ 13,582	.....	.....	.....	.....

^b Includes board and room. NUMBER WEEKS OPERATED: * 40 full, 12 short. CAUSE OF INCREASE OR REDUCTION: † Prosperity.

STATUTORY INVESTIGATION—PART I—CONTINUED.

WAYNE COUNTY

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.						
			1899.			1900.			
			1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Brick and tile works	1	1	12	—	12	7	—	7
2	Coal mining	2	2	230	—	230	132	—	132
	Total	3	3	242	—	242	139	—	139

WEBSTER COUNTY.

1	Agricultural implement agency	1	1	11	1	12	15	—	15
2	Banking	1	1	9	—	9	10	—	10
3	Brick and tile works	4	4	98	1	99	99	1	100
4	Candy and cracker manufactory	1	1	3	3	6	5	4	9
5	Coal mining	7	8	359	—	359	167	—	167
6	Contracting for building	1	1	10	—	10	—	—	—
7	Dry goods and general merchandise	3	3	10	15	25	10	—	10
8	Electric power and light	1	1	8	—	8	10	—	10
9	Foundry and machine shop	1	1	17	—	17	16	—	16
10	Hardware retail	1	1	6	—	6	7	—	7
11	Hotel	1	1	17	13	30	17	3	20
12	Merchant tailoring	1	1	30	—	30	—	—	—
13	Milling meal and cereals	1	1	18	2	20	20	2	22
14	Paint manufactory	3	3	160	—	160	100	—	100
15	Plaster manufactory	2	2	21	7	28	19	4	23
16	Printing and binding	1	1	17	—	17	18	—	18
17	Sash door and blind manufactory	1	1	60	65	125	85	50	135
18	Shoe manufactory	1	1	21	—	21	20	—	20
19	Stoneware manufactory	1	1	—	—	—	—	—	—

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.	INCREASE OR REDUCTION OF DAILY WAGES DURING				
		1899.			1900.		1899.		1900.		
		Males.	Females.	Total.	Males.		Females.	Total.	Increase (per cent.)	Reduction (per cent.)	Increase (per cent.)	Reduction (per cent.)
1	Brick and tile works.....	\$ 3,000		\$ 3,000	\$ 1,500		\$ 1,500				
2	Coal mining.....	79,370		79,370	55,205		55,205				
	Total.....	\$ 82,370		\$ 82,370	\$ 56,705		\$ 56,705				
CAUSE OF INCREASE OR REDUCTION / Uniform scale made by miners and operators. / Forced to by miners union.											
WEBSTER COUNTY.											
1	Agricultural implement agency.....	\$ 6,000	\$ 360	\$ 6,360	\$ 11,000		\$ 11,000				
2	Banking.....	8,300		8,300	10,000		10,000				
3	Brick and tile works.....	32,697	270	32,967	41,000	300	41,300				
4	Candy and cracker manufactory.....	1,300	600	1,900	3,256	760	4,016				
5	Coal mining.....	169,952		169,952	76,771		76,771				
6	Contracting for buildings.....	12,000		12,000							
7	Dry goods and general merchandise.....	5,800	3,500	9,300							
8	Electric power and light.....	6,660		6,660	6,720		6,720				
9	Foundry and machine shop.....	4,500		4,500	1,500		1,500				
10	Hardware retail.....	10,210		10,210	9,892		9,892				
11	Hotel.....										
12	Merchant tailoring.....	8,951	478	9,429	8,951	478	9,429				
13	Milling m'al. and cereals.....	19,372	688	20,060							
14	Paint manufacturers.....	6,282	400	6,682	6,869	350	7,219				
15	Plaster manufactory.....	72,729		72,729	50,897		50,897				
16	Printing and binding.....	11,280	1,582	12,862	12,993	1,184	14,177				
17	Sash door and blind manufactory.....	9,261		9,261	10,500		10,500				
18	Shoe manufactory.....										
19	Stoneware manufactory.....	6,750		6,750	9,997		9,997				

STATUTORY INVESTIGATION—PART I—CONTINUED.

WEBSTER COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number estab- lish- ments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
			1899.			1900.		
			Males.	Females.	Total.	Males.	Females.	Total.
20	Transfer and expressng.....	n	1	.....	.....	7	1	8
21	Wholesale fruit and produce	2	12	3	15	8	2	10
22	Wholesale groceries.....	1	23	2	25	14	3	17
	Total.....	37	946	120	1,066	657	94	751
	n Not reported.							

WINNESHEIK COUNTY:

1	Clothing retail	1	1	7	38	7	7	19
2	Dry goods and general merchandise	3	2	18	20	8	8	19
3	Electric light and power	1	1	18	20	8	8	19
4	Hotel	1	1	18	20	8	8	19
5	Printing and publishing	2	2	27	12	16	13	47
6	Sash, door, and blind manufactory	1	1	23	1	28	4	18
7	Wagon and sleigh manufactory	1	1	23	1	23	1	22
8	Wagon and general repairing	1	1	14	1	15	15	15
Total		10	10	108	33	141	101	132
* Not reported.								

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.	INCREASE OR REDUCTION OF DAILY WAGES DURING				
		1899.		1900.			1899.		1900.		
		Males.	Females.	Total.	Males.		Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)
20	Transfer and expressing.	8,002	1,266	9,268	c	1,173	20				
21	Wholesale fruit and produce.	21,390	1,160	22,550	6,180	7,116	52				
22	Wholesale groceries				11,543	1,620	52				
	Total	\$121,470	\$10,304	\$470,443	\$278,060	\$333,529					
<i>a</i> Separate accounts for males and females not reported. <i>b</i> One establishment only.											
NUMBER WEEKS OPERATED: * 36 full, 8 short. + 33 full, 10 short. + 48 full, 4 short. \$ 48 full, 4 short. || 35 full, 15 short.											
CAUSE OF INCREASE OR REDUCTION: <i>r</i> Better times. <i>s</i> Increased cost of living. <i>t</i> Miners struck for it. <i>u</i> Agreement with miners union. <i>v</i> Demanded by labor. <i>w</i> Better times. <i>x</i> Competition. <i>y</i> Men struck for it. <i>z</i> Improved business.											

WINNESHEIK COUNTY.

1	Clothing retail	\$ 4,500	\$ 7,959	\$ 4,500	\$ 4,800	\$ 3,481	\$ 4,800	.....	\$2	.....
2	Dry goods and general merchandise	5,732	<i>b</i> 600	13,391	5,361	<i>b</i> 1,240	8,812	.....	52	.....
3	Printing and publishing	.....	<i>c</i>	2,953	2,780	.....	.....	.....	52	.....
4	Hotel	.....	<i>c</i>	14,664	25,774	.....	27,204	.....	52	.....
5	Sash, door and blind manufactory	10,219	.....	10,219	.....	.....	.....	.....	52	.....
6	Wagon and sleigh manufactory	5,449	.....	5,449	6,460	.....	.....	.....	52	.....
7	Wagon and general repairing	5,430	.....	5,430	.....	.....	6,460	.....	52	.....
8	Electric light and power	.....	.....	.....	2,500	.....	2,500	.....	52	.....
	Total	\$ 31,920	\$ 9,112	\$ 55,706	\$ 45,605	\$ 6,221	\$ 62,326	.....	.....	.....

b Includes board and room. *c* Separate accounts for males and females not reported.

NUMBER WEEKS OPERATED: * 30 full, 20 short, † 42 full, 10 short, ‡ 16 full, 30 short.

CAUSE OF INCREASE OR REDUCTION: † Hard to keep help. ‡ Scarcity of help.

\$ 40 full, 12 short.

STATUTORY INVESTIGATION—PART I—CONTINUED.
WOODBURY COUNTY.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number of establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Agricultural implement agencies.....	1	2	10	.....	10	13	.....	13
2	Agricultural implement manufactory.....	4	1	16	.....	16	16	.....	17
3	Bakery, bread, cake and pies.....	1	3	27	.....	27	31	5	29
4	Bakery, crackers, biscuits and candy.....	1	1	48	66	114	.....	.....	.....
5	Banking, loans and investments.....	1	1	8	.....	8	9	1	10
6	Brick and tile works.....	4	3	162	.....	162	125	.....	125
7	Bridge work and boiler manufactory.....	1	1	11	.....	11	14	.....	14
8	Candy manufactory.....	1	1	20	10	30	.....	.....	.....
9	Cigar dealers and manufactory.....	3	5	46	.....	46	58	.....	58
10	Clothing, retail.....	4	3	37	3	40	26	1	27
11	Clothing, merchant tailoring.....	3	2	38	2	40	21	.....	21
12	Coal, retail.....	1	1	8	2	10	13	2	15
13	Contractor and builder.....	1	1	20	.....	20	30	.....	30
14	Cooperage.....	1	1	7	.....	7	6	.....	6
15	Drugs, retail.....	1	1	42	6	48	32	.....	32
16	Drugs, wholesale.....	2	1	169	265	434	267	253	460
17	Dry goods and general merchandise, retail.....	7	5	17	2	19	18	1	19
18	Dry goods, wholesale.....	1	1	25	.....	25	.....	.....	.....
19	Electrical supply manufactory.....	1	1	82	1	83	60	.....	60
20	Electric power, light and gas.....	1	1	21	4	25	.....	.....	.....
21	Florist, cut flowers, etc.....	1	1	16	2	18	15	2	17
22	Furniture, retail.....	1	1	234	28	262	233	29	262
23	Groceries, retail.....	4	4	18	1	19	7	.....	7
24	Groceries, wholesale.....	4	4	117	4	121	78	10	88
25	Hardware, retail.....	3	3	155	81	236	148	73	221
26	Hardware, wholesale and manufactory.....	10	9	.....	.....	.....	.....	.....	.....
27	Hotels and restaurants.....	1	1	.....	.....	.....	.....	.....	.....

Marital number.	INDUSTRY OR KIND OF BUSINESS.				TOTAL WAGES PAID DURING YEAR.				AVERAGE number of weeks in operation.				INCREASE OR REDUCTION OF DAILY WAGES DURING			
					1899.		1900.				1899.		1900.			
	Males.	Females.	Total.		Males.	Females.	Total.	1899.	1900.	Increase (per cent.)	Reduction (per cent.)	Increase (per cent.)	Reduction (per cent.)			
1	6,798		6,798	9,127		9,127	9,107	52	52	15.00						
2	8,957		8,957	9,245		9,245	9,245	50	46	10.00						
3	14,753	1,454	16,207	19,954		1,742	18,666	52	52	10.00						
4	20,287	14,966	35,253	7,840	600	9,960		52	52	10.00						
5	7,199	650	7,849	9,360			9,960	52	52							
6	51,935	9,935	61,870	50,459			50,459	40	45	10.00						
7	6,864		6,864	8,400			8,400	52	52	5.00						
8		c	15,012					52	52							
9	37,652		37,652	43,094			43,094	52	52							
10	24,212	1,331	25,543	35,324	624	15,948	15,948	52	52	12.5						
11	22,818	420	23,238	15,368		15,368	15,368	50	50							
12	5,000	500	5,500	7,400	720	8,120	8,120	52	52							
13	13,000		13,000	14,500		14,500	14,500	52	52	5.00						
14				2,500		2,500	2,500									
15	3,420		3,420	3,700		3,700	3,700	52	52	5.00						
16		c	29,430	19,683	1,757	21,440	21,440	52	52	10.00						
17	113,418	67,005	180,423	86,594	71,975	161,569	161,569	52	52	10.00						
18		600	14,600	13,500	400	13,900	13,900	52	52							
19	13,500		13,500	36,000		36,000	36,000	52	52							
20	24,195	720	24,915					52	52							
21	2,700	150	2,850					52	52							
22	12,000	1,500	13,500	9,950		9,950	10,950	52	52	10.00						
23	8,985	1,800	10,785	216,591	950	217,541	217,541	52	52	10.00						
24		c	212,093					52	52							
25	9,300	140	9,440	5,000		5,000	5,000	52	52	10.00						
26	75,693	2,220	77,913	56,478	4,944	61,422	61,422	52	52	10.00						
27	41,847	6,150	47,997	41,570	6,151	47,721	47,721	52	52	10.00						
28	10,500	500	11,000	4,600		4,600	4,600	50	50							
29	4,000		4,000	11,845		11,845	11,845	52	52							
30								52	52							

STATUTORY INVESTIGATION—PART I—CONTINUED.

WOODBURY COUNTY—CONTINUED.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number estab- lish- ments reporting.	AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
			1899.			1900.		
			1899	Males.	Females.	Total.	Males.	Females.
			1899	1900				
31	Insurance life.....	1	1	17	5	32	8	9
32	Jewelry and silversmith.....	1	1	8	..	..	..	15
33	Laundry, steam.....	1	1	12	..	..	..	33
34	Live stock commission.....	2	4	12	..	12	10	1
35	Livery.....	1	1	12	..	..	..	12
36	Lumber, wholesale.....	1	1	16	..	..	..	5
37	Machine shops and foundries.....	3	2	40	1	41	25	1
38	Milling, flour and cereals.....	1	1	109	11	120	65	1
39	Mineral water and soft drinks.....	1	1	17	..	..	..	7
40	Oils, lubricating and illuminating.....	1	1	10	1	11	14	1
41	Overall and shirt manufactory.....	1	1	35	..	..	..	15
42	Packers and cold storage.....	1	1	802	85	887	56	54
43	Painting, decorating and wall paper.....	2	3	29	31	60	90	..
44	Paper box manufactory.....	1	1	16	16	32	40	1
45	Printing, binding and fitting supplies.....	4	5	21	4	25	12	6
46	Printing, binding and publishing.....	3	3	360	20	380	380	398
47	Produce, commission, wholesale.....	2	2	59	1	60	18	..
48	Saddlery and harness manufactory.....	2	2	37	1	38	16	..
49	Sash door and bank fixture manufactory.....	2	2	27	..	..	..	58
50	Seeds and shrubs.....	1	1	40	40	80	..	..
51	Soap manufactory.....	1	1	18	7	25	11	7
52	Starch manufactory.....	1	1	63	41	104	35	90
53	Stock and feed yards.....	1	1	85	..	85	75	75
54	Street car transportation.....	1	1	199	1	200	..	..
55	Vinegar and cider manufactory.....	1	1	..	..	..	3	15
56	Water Supply.....	1	1	13	..	13	12	..
57	Wholesale crockery.....	1	1	4	3	7	..	..

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.			AVERAGE number of weeks in operation.			INCREASE OR REDUCTION OF DAILY WAGES DURING			
		1899.		1900.	1899.		1900.	1899.		1900.	
		Males.	Females.	Total.	Males.	Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)	Reduc-tion (per cent.)
30	Insurance, life	c	c	c 19,760	7,800		7,800	1720 00			
31	Jewelry and silversmith	7,500		7,500	1,792	1,872	3,664	52			
32	Laundry, steam	15,251		15,251	74,386	600	74,986	52			
33	Live stock commission	5,286		5,286	5,300		5,300	52			0/8 12.5
34	Livery	4,750		4,750	4,396		4,396	52			
35	Lumber, wholesale	18,297	480	18,777	15,250	480	15,730	52			
36	Machine shops and foundries	50,103	1,500	51,603	35,270	600	35,870	52	** 52	52	20 5.00
37	Milling, flour and cereals	3,632		3,632	3,512		3,512	52	52	52	10.00
38	Mineral water and soft drinks	8,900	500	9,400	12,500	600	13,100	52	52	52	
39	Oils, lubricating and illuminating	15,511		15,511	24,421		24,421	** 52	52	52	
40	Oil, linseed	4,117		4,117	3,550		3,550	** 52	52	52	
41	Overall and shirt manufactory	471,645	10,607	482,252	578,110	13,563	591,673	** 46	45	45	24 15.00
42	Packers and cold storage	21,000	250	21,250	15,000	390	15,390	52			
43	Painting, decorating and wall paper	c		c 3,000				52			
44	Paper box manufactory	13,683	836	14,519	21,713	1,608	23,321	** 50	50	50	25 12.5
45	Plumbing and steam fitting supplies	188,743	7,351	196,094	191,782	6,948	198,730	52	52	52	20 10.00
46	Printing, binding and publishing	37,619	1,277	38,896	31,342	2,665	34,007	52	52	52	60 00
47	Produce commission, wholesale	18,116	250	18,366	11,837	365	12,202	** 52	52	52	27 20.00
48	Saddlery and harness manufactory	29,200		29,200	26,480		26,480	52	52	52	10 00
49	Sash, door and bank fixtures manufactory	c		c 7,447				** 52	52	52	28 10 00
50	Seeds and shrubs	5,915	1,494	7,409	5,345	1,097	6,442	** 52	52	52	
51	Soap manufactory	11,354	1,749	13,103	24,767	5,417	30,204	16 34	52	52	
52	Starch manufactory	54,004		54,004	53,262		53,262	52	52	52	
53	Stock and feed yards	99,835	360	100,195				52	52	52	12.00
54	Street car transportation				4,000	400	4,400	52	52	52	
55	Vinegar and cider manufactory	11,188		11,188	10,686		10,686	52	52	52	
56	Water supply	1,644		1,644				50	50	50	29 10.00
57	Wholesale crockery			2,724							

STATUTORY INVESTIGATION—PART I—CONTINUED.

WOODBURY COUNTY—CONTINUED.

Marginal number	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.		1900.			
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
58	Wholesale liquors,.....	3	3	35	.....	35	40	.....	40
59	Wholesale toys and stationery.....	1	1	13	2	15	17	3	20
	Total	115	100	3,505	758	4,263	3,276	599	3,875
	n. Not reported.								

WORTH COUNTY.

1	Grain and agricultural implements,	1	1	14	.....	14	12	.....	12
2	Milling, flour and cereals,	n	1	.....	.....	.....	5	.....	5
3	Tow manufactory,	n	1	.....	.....	.....	9	.....	9
	Total,	1	3	14	.....	14	25	.....	26
	n. Not reported								

WRIGHT COUNTY.

1	Brick and tile works,	n	1	.....	.....	.....	6	.....	6
2	Hotel,	2	1	4	9	13	4	11	15
	Total,	2	2	4	9	13	10	11	21
	n. Not reported.								

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.				Average number of weeks in operation.	DAILY WAGES DURING				
		1899.		1900.			1899.		1900.		
		Males.	Females.	Total.	Males.		Females.	Total.	In-crease (per cent.)	Reduc-tion (per cent.)	In-crease (per cent.)
58	Wholesale liquors	21,352	9,500	23,352	20,904		20,904	52		52	
59	Wholesale toys and stationery	540		10,040	9,500		1,300	52		52	
	Total	\$1,684,093	\$153,769	\$2,123,504	\$1,090,659	\$161,226	\$2,071,285				
<i>6</i> Includes room and board. <i>c</i> Separate accounts for males and females, not reported. <i>d</i> One establishment only. <i>e</i> Demand for brick. <i>f</i> Our desire to act square. <i>g</i> Men demanded it. <i>h</i> Demand for labor. <i>i</i> Demand for some clerks. <i>j</i> Demand for brick. <i>k</i> Demand for brick. <i>l</i> Demand for brick. <i>m</i> Demand for brick. <i>n</i> Demand for brick. <i>o</i> Demand for brick. <i>p</i> Demand for brick. <i>q</i> Prosperity. <i>r</i> Demand for labor. <i>s</i> Demand for labor. <i>t</i> Demand for labor. <i>u</i> Demand for labor. <i>v</i> Demand for labor. <i>w</i> Demand for labor. <i>x</i> Demand for labor. <i>y</i> Demand for labor. <i>z</i> Demand for labor. <i>aa</i> Demand for labor. <i>ab</i> Demand for labor. <i>ac</i> Demand for labor. <i>ad</i> Demand for labor. <i>ae</i> Demand for labor. <i>af</i> Demand for labor. <i>ag</i> Demand for labor. <i>ah</i> Demand for labor. <i>ai</i> Demand for labor. <i>aj</i> Demand for labor. <i>ak</i> Demand for labor. <i>al</i> Demand for labor. <i>am</i> Demand for labor. <i>an</i> Demand for labor. <i>ao</i> Demand for labor. <i>ap</i> Demand for labor. <i>aq</i> Demand for labor. <i>ar</i> Demand for labor. <i>as</i> Demand for labor. <i>at</i> Demand for labor. <i>au</i> Demand for labor. <i>av</i> Demand for labor. <i>aw</i> Demand for labor. <i>ax</i> Demand for labor. <i>ay</i> Demand for labor. <i>az</i> Demand for labor. <i>ba</i> Demand for labor. <i>bb</i> Demand for labor. <i>bc</i> Demand for labor. <i>bd</i> Demand for labor. <i>be</i> Demand for labor. <i>bf</i> Demand for labor. <i>bg</i> Demand for labor. <i>bh</i> Demand for labor. <i>bi</i> Demand for labor. <i>bj</i> Demand for labor. <i>bk</i> Demand for labor. <i>bl</i> Demand for labor. <i>bm</i> Demand for labor. <i>bn</i> Demand for labor. <i>bo</i> Demand for labor. <i>bp</i> Demand for labor. <i>bq</i> Demand for labor. <i>br</i> Demand for labor. <i>bs</i> Demand for labor. <i>bt</i> Demand for labor. <i>bu</i> Demand for labor. <i>bv</i> Demand for labor. <i>bw</i> Demand for labor. <i>bx</i> Demand for labor. <i>by</i> Demand for labor. <i>bz</i> Demand for labor. <i>ca</i> Demand for labor. <i>cb</i> Demand for labor. <i>cc</i> Demand for labor. <i>cd</i> Demand for labor. <i>ce</i> Demand for labor. <i>cf</i> Demand for labor. <i>cg</i> Demand for labor. <i>ch</i> Demand for labor. <i>ci</i> Demand for labor. <i>cj</i> Demand for labor. <i>ck</i> Demand for labor. <i>cl</i> Demand for labor. <i>cm</i> Demand for labor. <i>cn</i> Demand for labor. <i>co</i> Demand for labor. <i>cp</i> Demand for labor. <i>cq</i> Demand for labor. <i>cr</i> Demand for labor. <i>cs</i> Demand for labor. <i>ct</i> Demand for labor. <i>cu</i> Demand for labor. <i>cv</i> Demand for labor. <i>cw</i> Demand for labor. <i>cx</i> Demand for labor. <i>cy</i> Demand for labor. <i>cz</i> Demand for labor. <i>da</i> Demand for labor. <i>db</i> Demand for labor. <i>dc</i> Demand for labor. <i>dd</i> Demand for labor. <i>de</i> Demand for labor. <i>df</i> Demand for labor. <i>dg</i> Demand for labor. <i>dh</i> Demand for labor. <i>di</i> Demand for labor. <i>dj</i> Demand for labor. <i>dk</i> Demand for labor. <i>dl</i> Demand for labor. <i>dm</i> Demand for labor. <i>dn</i> Demand for labor. <i>do</i> Demand for labor. <i>dp</i> Demand for labor. <i>dq</i> Demand for labor. <i>dr</i> Demand for labor. <i>ds</i> Demand for labor. <i>dt</i> Demand for labor. <i>du</i> Demand for labor. <i>dv</i> Demand for labor. <i>dw</i> Demand for labor. <i>dx</i> Demand for labor. <i>dy</i> Demand for labor. <i>dz</i> Demand for labor. <i>ea</i> Demand for labor. <i>eb</i> Demand for labor. <i>ec</i> Demand for labor. <i>ed</i> Demand for labor. <i>ee</i> Demand for labor. <i>ef</i> Demand for labor. <i>eg</i> Demand for labor. <i>eh</i> Demand for labor. <i>ei</i> Demand for labor. <i>ej</i> Demand for labor. <i>ek</i> Demand for labor. <i>el</i> Demand for labor. <i>em</i> Demand for labor. <i>en</i> Demand for labor. <i>eo</i> Demand for labor. <i>ep</i> Demand for labor. <i>eq</i> Demand for labor. <i>er</i> Demand for labor. <i>es</i> Demand for labor. <i>et</i> Demand for labor. <i>eu</i> Demand for labor. <i>ev</i> Demand for labor. <i>ew</i> Demand for labor. <i>ex</i> Demand for labor. <i>ey</i> Demand for labor. <i>ez</i> Demand for labor. <i>fa</i> Demand for labor. <i>fb</i> Demand for labor. <i>fc</i> Demand for labor. <i>fd</i> Demand for labor. <i>fe</i> Demand for labor. <i>ff</i> Demand for labor. <i>fg</i> Demand for labor. <i>fh</i> Demand for labor. <i>fi</i> Demand for labor. <i>fj</i> Demand for labor. <i>fk</i> Demand for labor. <i>fl</i> Demand for labor. <i>fm</i> Demand for labor. <i>fn</i> Demand for labor. <i>fo</i> Demand for labor. <i>fp</i> Demand for labor. <i>fq</i> Demand for labor. <i>fr</i> Demand for labor. <i>fs</i> Demand for labor. <i>ft</i> Demand for labor. <i>fu</i> Demand for labor. <i>fv</i> Demand for labor. <i>fw</i> Demand for labor. <i>fx</i> Demand for labor. <i>fy</i> Demand for labor. <i>fz</i> Demand for labor. <i>ga</i> Demand for labor. <i>gb</i> Demand for labor. <i>gc</i> Demand for labor. <i>gd</i> Demand for labor. <i>ge</i> Demand for labor. <i>gf</i> Demand for labor. <i>gg</i> Demand for labor. <i>gh</i> Demand for labor. <i>gi</i> Demand for labor. <i>gj</i> Demand for labor. <i>gk</i> Demand for labor. <i>gl</i> Demand for labor. <i>gm</i> Demand for labor. <i>gn</i> Demand for labor. <i>go</i> Demand for labor. <i>gp</i> Demand for labor. <i>gq</i> Demand for labor. <i>gr</i> Demand for labor. <i>gs</i> Demand for labor. <i>gt</i> Demand for labor. <i>gu</i> Demand for labor. <i>gv</i> Demand for labor. <i>gw</i> Demand for labor. <i>gx</i> Demand for labor. <i>gy</i> Demand for labor. <i>gz</i> Demand for labor. <i>ha</i> Demand for labor. <i>hb</i> Demand for labor. <i>hc</i> Demand for labor. <i>hd</i> Demand for labor. <i>he</i> Demand for labor. <i>hf</i> Demand for labor. <i>hg</i> Demand for labor. <i>hh</i> Demand for labor. <i>hi</i> Demand for labor. <i>hj</i> Demand for labor. <i>hk</i> Demand for labor. <i>hl</i> Demand for labor. <i>hm</i> Demand for labor. <i>hn</i> Demand for labor. <i>ho</i> Demand for labor. <i>hp</i> Demand for labor. <i>hq</i> Demand for labor. <i>hr</i> Demand for labor. <i>hs</i> Demand for labor. <i>ht</i> Demand for labor. <i>hu</i> Demand for labor. <i>hv</i> Demand for labor. <i>hw</i> Demand for labor. <i>hx</i> Demand for labor. <i>hy</i> Demand for labor. <i>hz</i> Demand for labor. <i>ia</i> Demand for labor. <i>ib</i> Demand for labor. <i>ic</i> Demand for labor. <i>id</i> Demand for labor. <i>ie</i> Demand for labor. <i>if</i> Demand for labor. <i>ig</i> Demand for labor. <i>ih</i> Demand for labor. <i>ii</i> Demand for labor. <i>ij</i> Demand for labor. <i>ik</i> Demand for labor. <i>il</i> Demand for labor. <i>im</i> Demand for labor. <i>in</i> Demand for labor. <i>io</i> Demand for labor. <i>ip</i> Demand for labor. <i>iq</i> Demand for labor. <i>ir</i> Demand for labor. <i>is</i> Demand for labor. <i>it</i> Demand for labor. <i>iu</i> Demand for labor. <i>iv</i> Demand for labor. <i>iw</i> Demand for labor. <i>ix</i> Demand for labor. <i>iy</i> Demand for labor. <i>iz</i> Demand for labor. <i>ja</i> Demand for labor. <i>jb</i> Demand for labor. <i>jc</i> Demand for labor. <i>jd</i> Demand for labor. <i>je</i> Demand for labor. <i>jf</i> Demand for labor. <i>jj</i> Demand for labor. <i>jk</i> Demand for labor. <i>jl</i> Demand for labor. <i>jm</i> Demand for labor. <i>jn</i> Demand for labor. <i>jo</i> Demand for labor. <i>jp</i> Demand for labor. <i>jq</i> Demand for labor. <i>jr</i> Demand for labor. <i>js</i> Demand for labor. <i>jt</i> Demand for labor. <i>ju</i> Demand for labor. <i>jv</i> Demand for labor. <i>jw</i> Demand for labor. <i>jx</i> Demand for labor. <i>ky</i> Demand for labor. <i>kz</i> Demand for labor. <i>la</i> Demand for labor. <i>lb</i> Demand for labor. <i>lc</i> Demand for labor. <i>ld</i> Demand for labor. <i>le</i> Demand for labor. <i>lf</i> Demand for labor. <i>lg</i> Demand for labor. <i>lh</i> Demand for labor. <i>li</i> Demand for labor. <i>lj</i> Demand for labor. <i>lk</i> Demand for labor. <i>ll</i> Demand for labor. <i>lm</i> Demand for labor. <i>ln</i> Demand for labor. <i>lo</i> Demand for labor. <i>lp</i> Demand for labor. <i>lq</i> Demand for labor. <i>lr</i> Demand for labor. <i>ls</i> Demand for labor. <i>lt</i> Demand for labor. <i>lu</i> Demand for labor. <i>lv</i> Demand for labor. <i>lw</i> Demand for labor. <i>lx</i> Demand for labor. <i>ly</i> Demand for labor. <i>lz</i> Demand for labor. <i>ma</i> Demand for labor. <i>mb</i> Demand for labor. <i>mc</i> Demand for labor. <i>md</i> Demand for labor. <i>me</i> Demand for labor. <i>mf</i> Demand for labor. <i>mg</i> Demand for labor. <i>mh</i> Demand for labor. <i>mi</i> Demand for labor. <i>mj</i> Demand for labor. <i>mk</i> Demand for labor. <i>ml</i> Demand for labor. <i>mn</i> Demand for labor. <i>mo</i> Demand for labor. <i>mp</i> Demand for labor. <i>mq</i> Demand for labor. <i>mr</i> Demand for labor. <i>ms</i> Demand for labor. <i>mt</i> Demand for labor. <i>mu</i> Demand for labor. <i>mv</i> Demand for labor. <i>mw</i> Demand for labor. <i>mx</i> Demand for labor. <i>my</i> Demand for labor. <i>mz</i> Demand for labor. <i>na</i> Demand for labor. <i>nb</i> Demand for labor. <i>nc</i> Demand for labor. <i>nd</i> Demand for labor. <i>ne</i> Demand for labor. <i>nf</i> Demand for labor. <i>ng</i> Demand for labor. <i>nh</i> Demand for labor. <i>ni</i> Demand for labor. <i>nj</i> Demand for labor. <i>nk</i> Demand for labor. <i>nl</i> Demand for labor. <i>nm</i> Demand for labor. <i>nn</i> Demand for labor. <i>no</i> Demand for labor. <i>np</i> Demand for labor. <i>nq</i> Demand for labor. <i>nr</i> Demand for labor. <i>ns</i> Demand for labor. <i>nt</i> Demand for labor. <i>nu</i> Demand for labor. <i>nv</i> Demand for labor. <i>nw</i> Demand for labor. <i>nx</i> Demand for labor. <i>ny</i> Demand for labor. <i>nz</i> Demand for labor. <i>oa</i> Demand for labor. <i>ob</i> Demand for labor. <i>oc</i> Demand for labor. <i>od</i> Demand for labor. <i>oe</i> Demand for labor. <i>of</i> Demand for labor. <i>og</i> Demand for labor. <i>oh</i> Demand for labor. <i>oi</i> Demand for labor. <i>oj</i> Demand for labor. <i>ok</i> Demand for labor. <i>ol</i> Demand for labor. <i>om</i> Demand for labor. <i>on</i> Demand for labor. <i>oo</i> Demand for labor. <i>op</i> Demand for labor. <i>oq</i> Demand for labor. <i>or</i> Demand for labor. <i>os</i> Demand for labor. <i>ot</i> Demand for labor. <i>ou</i> Demand for labor. <i>ov</i> Demand for labor. <i>ow</i> Demand for labor. <i>ox</i> Demand for labor. <i>oy</i> Demand for labor. <i>oz</i> Demand for labor. <i>pa</i> Demand for labor. <i>pb</i> Demand for labor. <i>pc</i> Demand for labor. <i>pd</i> Demand for labor. <i>pe</i> Demand for labor. <i>pf</i> Demand for labor. <i>pg</i> Demand for labor. <i>ph</i> Demand for labor. <i>pi</i> Demand for labor. <i>pj</i> Demand for labor. <i>pk</i> Demand for labor. <i>pl</i> Demand for labor. <i>pm</i> Demand for labor. <i>pn</i> Demand for labor. <i>po</i> Demand for labor. <i>pp</i> Demand for labor. <i>pq</i> Demand for labor. <i>pr</i> Demand for labor. <i>ps</i> Demand for labor. <i>pt</i> Demand for labor. <i>pu</i> Demand for labor. <i>pv</i> Demand for labor. <i>pw</i> Demand for labor. <i>px</i> Demand for labor. <i>py</i> Demand for labor. <i>pz</i> Demand for labor. <i>qa</i> Demand for labor. <i>qb</i> Demand for labor. <i>qc</i> Demand for labor. <i>qd</i> Demand for labor. <i>qe</i> Demand for labor. <i>qf</i> Demand for labor. <i>qg</i> Demand for labor. <i>qh</i> Demand for labor. <i>qi</i> Demand for labor. <i>qj</i> Demand for labor. <i>qk</i> Demand for labor. <i>ql</i> Demand for labor. <i>qm</i> Demand for labor. <i>qn</i> Demand for labor. <i>qo</i> Demand for labor. <i>qp</i> Demand for labor. <i>qq</i> Demand for labor. <i>qr</i> Demand for labor. <i>qs</i> Demand for labor. <i>qt</i> Demand for labor. <i>qu</i> Demand for labor. <i>qv</i> Demand for labor. <i>qw</i> Demand for labor. <i>qx</i> Demand for labor. <i>qy</i> Demand for labor. <i>qz</i> Demand for labor. <i>ra</i> Demand for labor. <i>rb</i> Demand for labor. <i>rc</i> Demand for labor. <i>rd</i> Demand for labor. <i>re</i> Demand for labor. <i>rf</i> Demand for labor. <i>rg</i> Demand for labor. <i>rh</i> Demand for labor. <i>ri</i> Demand for labor. <i>rj</i> Demand for labor. <i>rk</i> Demand for labor. <i>rl</i> Demand for labor. <i>rm</i> Demand for labor. <i>rn</i> Demand for labor. <i>ro</i> Demand for labor. <i>rp</i> Demand for labor. <i>rq</i> Demand for labor. <i>rr</i> Demand for labor. <i>rs</i> Demand for labor. <i>rt</i> Demand for labor. <i>ru</i> Demand for labor. <i>rv</i> Demand for labor. <i>rw</i> Demand for labor. <i>rx</i> Demand for labor. <i>ry</i> Demand for labor. <i>rz</i> Demand for labor. <i>sa</i> Demand for labor. <i>sb</i> Demand for labor. <i>sc</i> Demand for labor. <i>sd</i> Demand for labor. <i>se</i> Demand for labor. <i>sf</i> Demand for labor. <i>sg</i> Demand for labor. <i>sh</i> Demand for labor. <i>si</i> Demand for labor. <i>sj</i> Demand for labor. <i>sk</i> Demand for labor. <i>sl</i> Demand for labor. <i>sm</i> Demand for labor. <i>sn</i> Demand for labor. <i>so</i> Demand for labor. <i>sp</i> Demand for labor. <i>sq</i> Demand for labor. <i>sr</i> Demand for labor. <i>ss</i> Demand for labor. <i>st</i> Demand for labor. <i>su</i> Demand for labor. <i>sv</i> Demand for labor. <i>sw</i> Demand for labor. <i>sx</i> Demand for labor. <i>sy</i> Demand for labor. <i>sz</i> Demand for labor. <i>ta</i> Demand for labor. <i>tb</i> Demand for labor. <i>tc</i> Demand for labor. <i>td</i> Demand for labor. <i>te</i> Demand for labor. <i>tf</i> Demand for labor. <i>tg</i> Demand for labor. <i>th</i> Demand for labor. <i>ti</i> Demand for labor. <i>tj</i> Demand for labor. <i>tk</i> Demand for labor. <i>tl</i> Demand for labor. <i>tm</i> Demand for labor. <i>tn</i> Demand for labor. <i>to</i> Demand for labor. <i>tp</i> Demand for labor. <i>tq</i> Demand for labor. <i>tr</i> Demand for labor. <i>ts</i> Demand for labor. <i>tt</i> Demand for labor. <i>tu</i> Demand for labor. <i>tv</i> Demand for labor. <i>tw</i> Demand for labor. <i>tx</i> Demand for labor. <i>ty</i> Demand for labor. <i>tz</i> Demand for labor. <i>ua</i> Demand for labor. <i>ub</i> Demand for labor. <i>uc</i> Demand for labor. <i>ud</i> Demand for labor. <i>ue</i> Demand for labor. <i>uf</i> Demand for labor. <i>ug</i> Demand for labor. <i>uh</i> Demand for labor. <i>ui</i> Demand for labor. <i>uj</i> Demand for labor. <i>uk</i> Demand for labor. <i>ul</i> Demand for labor. <i>um</i> Demand for labor. <i>un</i> Demand for labor. <i>uo</i> Demand for labor. <i>up</i> Demand for labor. <i>uq</i> Demand for labor. <i>ur</i> Demand for labor. <i>us</i> Demand for labor. <i>ut</i> Demand for labor. <i>uu</i> Demand for labor. <i>uv</i> Demand for labor. <i>uw</i> Demand for labor. <i>ux</i> Demand for labor. <i>uy</i> Demand for labor. <i>uz</i> Demand for labor. <i>va</i> Demand for labor. <i>vb</i> Demand for labor. <i>vc</i> Demand for labor. <i>vd</i> Demand for labor. <i>ve</i> Demand for labor. <i>vf</i> Demand for labor. <i>vg</i> Demand for labor. <i>vh</i> Demand for labor. <i>vi</i> Demand for labor. <i>vj</i> Demand for labor. <i>vk</i> Demand for labor. <i>vl</i> Demand for labor. <i>vm</i> Demand for labor. <i>vn</i> Demand for labor. <i>vo</i> Demand for labor. <i>vp</i> Demand for labor. <i>vq</i> Demand for labor. <i>vr</i> Demand for labor. <i>vs</i> Demand for labor. <i>vt</i> Demand for labor. <i>vu</i> Demand for labor. <i>vv</i> Demand for labor. <i>vw</i> Demand for labor. <i>vx</i> Demand for labor. <i>vy</i> Demand for labor. <i>vz</i> Demand for labor. <i>wa</i> Demand for labor. <i>wb</i> Demand for labor. <i>wc</i> Demand for labor. <i>wd</i> Demand for labor. <i>we</i> Demand for labor. <i>wf</i> Demand for labor. <i>wg</i> Demand for labor. <i>wh</i> Demand for labor. <i>wi</i> Demand for labor. <i>wj</i> Demand for labor. <i>wk</i> Demand for labor. <i>wl</i> Demand for labor. <i>wm</i> Demand for labor. <i>wn</i> Demand for labor. <i>wo</i> Demand for labor. <i>wp</i> Demand for labor. <i>wq</i> Demand for labor. <i>wr</i> Demand for labor. <i>ws</i> Demand for labor. <i>wt</i> Demand for labor. <i>wu</i> Demand for labor. <i>wv</i> Demand for labor. <i>wx</i> Demand for labor. <i>wy</i> Demand for labor. <i>wz</i> Demand for labor. <i>xa</i> Demand for labor. <i>xb</i> Demand for labor. <i>xc</i> Demand for labor. <i>xd</i> Demand for labor. <i>xe</i> Demand for labor. <i>xf</i> Demand for labor. <i>xg</i> Demand for labor. <i>xh</i> Demand for labor. <i>xi</i> Demand for labor. <i>xj</i> Demand for labor. <i>xk</i> Demand for labor. <i>xl</i> Demand for labor. <i>xm</i> Demand for labor. <i>xn</i> Demand for labor. <i>xo</i> Demand for labor. <i>xp</i> Demand for labor. <i>xq</i> Demand for labor. <i>xr</i> Demand for labor. <i>xs</i> Demand for labor. <i>xt</i> Demand for labor. <i>xu</i> Demand for labor. <i>xv</i> Demand for labor. <i>xw</i> Demand for labor. <i>xx</i> Demand for labor. <i>xy</i> Demand for labor. <i>xz</i> Demand for labor. <i>ya</i> Demand for labor. <i>yb</i> Demand for labor. <i>yc</i> Demand for labor. <i>yd</i> Demand for labor. <i>ye</i> Demand for labor. <i>yf</i> Demand for labor. <i>yg</i> Demand for labor. <i>yh</i> Demand for labor. <i>yi</i> Demand for labor. <i>yj</i> Demand for labor. <i>yk</i> Demand for labor. <i>yl</i> Demand for labor. <i>ym</i> Demand for labor. <i>yn</i> Demand for labor. <i>yo</i> Demand for labor. <i>yp</i> Demand for labor. <i>yq</i> Demand for labor. <i>yr</i> Demand for labor. <i>ys</i> Demand for labor. <i>yt</i> Demand for labor. <i>yu</i> Demand for labor. <i>yv</i> Demand for labor. <i>yw</i> Demand for labor. <i>yx</i> Demand for labor. <i>yy</i> Demand for labor. <i>yz</i> Demand for labor. <i>za</i> Demand for labor. <i>zb</i> Demand for labor. <i>zc</i> Demand for labor. <i>zd</i> Demand for labor. <i>ze</i> Demand for labor. <i>zf</i> Demand for labor. <i>zg</i> Demand for labor. <i>zh</i> Demand for labor. <i>zi</i> Demand for labor. <i>zj</i> Demand for labor. <i>zk</i> Demand for labor. <i>zl</i> Demand for labor. <i>zm</i> Demand for labor. <i>zn</i> Demand for labor. <i>zo</i> Demand for labor. <i>zp</i> Demand for labor. <i>zq</i> Demand for labor. <i>zr</i> Demand for labor. <i>zs</i> Demand for labor. <i>zt</i> Demand for labor. <i>zu</i> Demand for labor. <i>zv</i> Demand for labor. <i>zw</i> Demand for labor. <i>zx</i> Demand for labor. <i>zy</i> Demand for labor. <i>zz</i> Demand for labor.											

WORTH COUNTY,

		\$	\$	\$	\$	\$	\$	\$	t
1	Grain and agricultural implements.....	7,390	6,140	6,140	52	52	10.00		
2	Milling, flour and cereals.....		2,000	2,000					
3	Tow manufactory.....		1,200	1,200					
	Total	7,390	9,340	9,340					

WRIGHT COUNTY.

	\$	540	b	1,370	b	1,910	\$	1,500	b	1,690	\$	1,500	b	2,378	52	30	
1 Brick and tile works.....																	
2 Hotel			b	540	b	1,370	b	1,910	b	688	b	1,500	b	2,378	52	30	
Total	\$	540		\$	1,370		\$	1,910		\$	2,188		\$	1,690		\$	3,878

b Includes board and room.

STATUTORY INVESTIGATION—PART I—CONTINUED.

MISCELLANEOUS.

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	Number establishments reporting.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.					
				1899.			1900.		
		1899	1900	Males.	Females.	Total.	Males.	Females.	Total.
1	Grain elevators (companies).....	2	2	71	3	74	47	2	49
2	Messenger service.....	1	1	100	3	103	95	1	96
3	Telegraph service.....	2	2	163	8	171	176	20	196
4	Telephone service.....	1	1	148	225	373	234	259	493
5	Refined oils.....	1	1	39	...	39	39	1	40
6	Lumber company.....	2	1	...	...	...	14	...	14
	Total.....	7	8	521	239	760	605	282	887

Marginal number.	INDUSTRY OR KIND OF BUSINESS.	TOTAL WAGES PAID DURING YEAR.						Average number of weeks in operation.		INCREASE OR REDUCTION OF DAILY WAGES DURING—				
		1899.			1900.			1899.	1900.	1899.		1900.		
		Males.	Females.	Total.	Males.	Females.	Total.			In-crease (per cent.)	Reduction (per cent.)	In-crease (per cent.)	Reduction (per cent.)	
1	Grain elevators (companies)	\$ 37,500	\$ 2,100	\$ 39,600	\$ 20,500	\$ 1,200	\$ 30,700	*	52	52	...	...	...	...
2	Messenger service	c	c	16,215	16,851	120	16,971	52	52	52	...	...	...	...
3	Telegraph service	51,481	3,765	55,246	82,091	10,787	92,878	52	52	52	...	...	...	...
4	Telephone service	81,081	70,584	151,665	141,405	61,920	203,325	52	52	52	...	...	...	...
5	Refined oils	35,302	...	35,302	37,777	300	38,077	52	52	52	...	...	5	10, 00
6	Lumber company.	...	...	...	9,465	...	9,466	...	52	52	...	...	6	10, 00
	Total.	\$ 205,164	\$ 76,449	\$ 281,613	\$ 317,084	\$ 74,327	\$ 391,410	...	...	...	...	...	...	...

1 Grain elevators (companies) \$ 37,500 \$ 2,100 \$ 39,600 \$ 29,500 \$ 1,200 \$ 30,700 * 52 52
 2 Messenger service c 16,245 c 16,245 16,851 120 16,971 52 52
 3 Telegraph service 51,481 3,765 55,246 82,091 10,787 92,878 52 52
 4 Telephone service 81,081 79,584 151,665 141,405 61,920 203,325 52 52
 5 Refined oils 35,302 35,302 37,777 37,777 38,077 52 52
 6 Lumber company, 35,302 35,302 37,777 37,777 38,077 52 52
 Total \$ 205,764 \$ 76,449 \$ 208,058 \$ 317,084 \$ 74,327 \$ 301,410

CAUSE OF INCREASE OR DECREASE: * 31 full, 18 short. c Separate accounts for male and female not reported. n Not reported.
 NUMBER WEEKS OPERATED: 1 More competent help. 2 Slight increase. 2 More business. 4 Special linemen received increase. 5 Good times. 6 Merit of employees.
 The above table comprises grain elevators, telegraph, telephone, messenger service, oil companies and lumber companies who did not employ 5 persons in each locality where their business was conducted but whose aggregate employees throughout the state exceeded five and comprised the numbers given in the table.

SUMMARY OF STATUTORY INVESTIGATION—BY COUNTIES.

COUNTY.	NUMBER ESTABLISHMENTS REPORTING.		AVERAGE NUMBER OF EMPLOYEES DURING YEAR.						TOTAL WAGES PAID DURING YEAR.					
			1899.			1900.			1899.			1900.		
	1899.	1900.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.	Males.	Females.	Total.
Total	1,428	1,285	44,430	9,812	54,251	41,803	9,281	51,175	17,542,266	\$1,505,103	\$2,987,731	\$18,552,404	\$1,704,388	\$21,145,661

Marginal number.

INDUSTRIAL INTRODUCTORY.

BY DR. W. R. PATTERSON.

following introductory should have been placed at the head of the tables of the manufacturing industries of the state, but it was not in time for insertion in the proper place, hence its appearance at the end of the report.

Reading this introductory I deem it of interest to call attention to the remarkable growth of the urban population of the state in the decade 1890-1900. The total population was 1,911,896 in 1890, and 2,231,853 in 1900, an increase of 319,957, and a gain of 16.7 per cent. During the same period the urban population increased from 694,029 to 975,641, an increase of 281,612, or a gain of 40.5 per cent., while the rural population increased from 1,217,867 to 1,256,212, an increase of 38,345, and a gain of only 3.14 per cent.

It is also shown that in 1890, the urban population constituted 36.3 per cent. of the total, and the rural the remainder, or 63.7 per cent., while in 1900 the urban population is 43.25 per cent. and the rural 56.75 per cent, a change of 6.95 per cent. in favor of hamlets, villages, towns and cities, thus clearly demonstrating that our manufacturing industries, which build the towns, are the chief factors in the development of our state.

The first table proves conclusively that the manufacturing interests are fast becoming dominant. The addition of 14,297 establishments in a period of twenty years represents an increase of 2,738.8 per cent. The capital invested in manufacturing, however, outstripped this, the increase being 7,853.8 per cent. In the same period the amount of wages paid advanced 4,959.3 per cent; the value of the products used, 4,192.5 per cent; the value of the product produced 4,534.7 per cent, while the population increased but 1,061.1 per cent. This favoring of manufacturing is due largely to the fact that Iowa attracted little attention until 1850. In 1840 its total population was 43,112, and invested capital \$1,000,000, some 83 per cent of which represented grist and saw mills. From 1840 to 1854 the progress, while rapid, was quite normal; but in this period the Chicago-Rock Island Railway was completed to the east bank of the Mississippi, opposite Davenport.* The next two years were years of great things for the state; not only was the Rock Island completed to Iowa City, but two other roads reached the Mississippi opposite Dubuque and Dubuque, and it was conceded that the Pacific Railway should pass through its territory. These activities gave a decided stimulus to manufacturing and industry. In 1855 an era of speculation began, which continued for two years. The principal cities sent out prospectuses descriptive of the present industries, and urging capitalists to take advantage of the rare opportunities they had to offer.†

The agencies were quite successful; immigrants and capital came, and the state was sprung up, and boom features were present. In many instances the state bonded themselves to such an extent, in order to offer bonuses to

desired industries, that they were obliged to repudiate their obligation. The hard times of 1858 to 1860 followed, which, while beneficial in checking the speculative spirit of the period, caused some capital to migrate westward, yet not in sufficient quantities to overcome the progress caused by the boom of 1855-1857. For these reasons, coupled with the stimulus of war demand and war prices, we have the notable rates of increase shown in the decades from 1850 to 1870. The percentages for the period 1860-1870 are misleading, in that the values given for 1870 are stated in a currency which was at a great discount in gold. If the plan adopted by the census of 1880 be followed, and the amounts given for 1870 be discounted one-fifth, we have the following results as to the principal items. Per cent of increase:

	1890-1900	1880-1890	1870-1880	1860-1870	1850-1860
Capital	32.5	128.1	89.5	147.4	460.0
Cost of material.....	27.6	62.8	119.9	157.1	251.0
Value of product.....	31.6	76.0	90.8	166.4	293.0

From these revised figures it appears that the per cent of increase has diminished, as is customary for all comparisons with a cumulative base, and that the great decline in the rate of increase from 1870 to 1880, followed by a marked rise from 1880 to 1890, is due more to a depreciated currency than to economic conditions. The single exception to this statement is the noticeable and significant increase of invested capital—128.1 per cent, and the slight advance in the number of establishments—7.5 per cent. This was in part a step toward the later forms of capitalistic production, the average capital per establishment in 1880 being \$4,910, and in 1890, \$10,418 and partially due to the political evils of the period.

Good transportation facilities, an abundance of coal well distributed, and a fertility of soil which has given it rank as one of the leading agricultural states of the Union, has rendered possible the present gratifying status of manufactures in Iowa. The same reasons account in part for the even distribution of these interests and their diversified character. No certain portion of the state or particular city can lay claim to a dominant interest in manufactures as a whole, or a comparative monopoly of any one of its leading industries.

The southern and eastern portions were settled first, and still have the denser population, yet the northern and western have produced the banner manufacturing city, if value of product be considered. Sioux City, however, only produced 9.4 per cent. of the product of the State. Still further no leading industry is particularly prominent. Slaughtering, which ranks first in value of product, represents but 15.6 per cent. of the total product of the state, while the industry next in order, cheese, butter and condensed milk, furnishes 9.6 per cent.

During this period of development a marked change in the character of the industries has taken place. In the early period of settlement the principal products manufactured were lumber, flour, leather and woollen goods, all of which have since declined with the exception of flour, while the industries necessary to the full realization of the agricultural possibilities of the state, slaughtering, and butter and cheese, have taken their place.

†Historical Reminiscences of the City of Des Moines, Turrell, 1857.
Northern Iowa, by a Pioneer, 1858.
A Brief Description of Fort Dodge, 1858.

early as 1840 the woolen products of Muscatine county were valued at \$19,900, and Cedar county produced hats and caps valued at \$19,900. It was expected that the people of the woolen industry to take the rank in Iowa in the east. The prospective circulars were careful to state the exact value of the business and seldom failed to point out the waste to be incurred in shipping of the raw wool to the eastern manufactories. Under this stimulus the industry reached its maximum proportions in 1870, when eight establishments report a product valued at \$1,561,341, or \$1,249, - allowance be made for the depreciated currency. From this date its product has gradually reduced in value until the present figure, 1900 has been reached. It is clear that the rearing of cattle and production of dairy products has been more attractive to the farmers of the state, and the decline of the sheep industry has been marked by a corresponding decline in the value of slaughtered and dairy products.

The decline in the lumber and timber industry has been less marked than in the woolen, but no less certain and significant if quality and quantity of product be considered. In the earlier decades, and perhaps to 1800, the lumber companies operated along the banks of the rivers, cutting only the best trees, and culling from a more extended area the finer woods. As a result the present lumber supply is gained largely from trees of so small size as to have been formerly refused; the walnut and oak is almost entirely wanting, while logs of all kinds must be conveyed considerable distance to ship or raft. In short, while a decline in the value of the product has been almost phenomenal, the real loss has been far greater due to the increased cost of production, as well as the advance in price resulting from an increased demand.

The industry of recent origin and peculiar to Iowa is the manufacture of buttons from the shells of native fresh water mussel. The leading center of the industry is Muscatine, which, in 1898, had five completely organized plants and twenty-eight saw works, yet almost every town on the Mississippi from Sabula to Fort Madison, a distance of 167 miles, is provided with plants, Davenport, Clinton and Keithsburg being sort of secondary centers. The industry has also been pursued at Cedar Rapids, Iowa and Charles City on the Cedar river; Coralville on the Iowa river, West Liberty, What Cheer and Oskaloosa, which latter place secured raw material from other sources.*

B. T. Boepple, a native of Hamburg, Germany, where he learned the trade, is given the credit for introducing the business in 1891. Stimulated by the high tariff placed on imported buttons by the tariff bill of 1890, assured of the excellence of the mussels in the Mississippi and rivers of Iowa he located his factory at Muscatine. The success of the industry was soon assured. By 1898 no less than 1,000 persons were engaged in mussel industry between Fort Madison and Sabula, while the number of persons employed in the manufacture of buttons is placed at 1,434, of which 1,042 males and 392 females. This rapid growth seems to have been abnormal, and several firms were obliged to give up the business, and a general lowering of the price was noted in 1899. The fear that the mussel beds will soon be exhausted seems well founded. The removal of 4,602 tons of shells in 1897,

Report of the U. S. Fish Commission, 1898.
Report of Labor Commissioner, Iowa, 1897-98.

and 3,641 in the year following shows the extent of the exploitation. The beds opposite Muscatine and New Boston are already worked out. No attention is paid to the spawning season of the principal species; multitudes of small mussels that cannot be utilized are left upon the banks or ice to die while even if proper care were taken it requires from ten to eighteen years to grow a serviceable shell. To date, however, the industry is in a fairly prosperous condition, and Mississippi river buttons are sold in every state in the Union, as also Canada and England. Only a portion of the product sold, however, is finished in Iowa or the adjoining section of Illinois. Several of the larger button factories of the east have "saw works" located here which cut out the rough blanks and ship them east for final manufacture. In a few cases the rough shells have been shipped. A buyer at LeClaire in the winter of 1898-99 had a contract of 1,000 tons to be shipped to New York, this form of the business is however exceptional.

TABLE NO. 4.

Based on value of product the order of importance of the cities of the state is as follows: Sioux City, Cedar Rapids, Dubuque, Davenport, Ottumwa and Clinton. If invested capital is made the criterion, the order is Davenport, Dubuque, Des Moines, Cedar Rapids, Marshalltown and Sioux City. One of the striking facts in the development of the state is the rapid progress of the latter city. In 1880, it was a place of minor importance, unknown as a manufacturing center, a decade later, the value of its manufactured products was \$14,119,843, which on this base easily gave it first rank, exceeding its nearest competitor, Davenport, by almost three million of dollars. Two facts are largely responsible for the position it has obtained. Its rapid increase in population has given carpentry an undue prominence and the slaughtering industry is one in which a small investment of capital produces a product of higher value than possible in most other lines. Yet its position as the principal city of the rapidly developing northwest is sufficiently advantageous to keep it in the front rank among the cities of the state. The influence of a dominant industry is further seen in Davenport which ranks first in the amount of capital invested. Here with \$1,914,400 invested in its dominant industry, lumber, the value of its product was but \$1,729,607 in 1890; while Sioux City in the same year with an investment of \$647,150, in the slaughtering industry, produced a product valued at \$7,589,228. Considerations, such as these, show the folly of attributing to any city first rank as a manufacturing center. The same reason accounts for the comparatively small output of several of the important cities of the state. The location of the state is such that it is a highway for the transfer of commodities between the east and the west, while extensive transportation facilities are necessary to place its own products on the market. Due to these conditions, we find extensive car construction and repair shops in Burlington, Davenport, Belle Plaine, Boone, Waterloo, Oelwein and other cities. An industry so prominent that it employs an average of 5,497 wage earners throughout the year, or 2,104 more than any other industry, and paid in the year 1900, \$2,948,948 in wages, \$1,525,816 more than any other manufacturing enterprise, yet a comparatively small product is produced.

PART II.

Report of Labor Commissioner
of Iowa.

THE VALUE AND INFLUENCE OF LABOR STATISTICS.*

BY CARROLL D. WRIGHT.

There are now in the United States, besides the Federal Department of Labor, thirty-one state bureaus or departments devoted to the collection of statistics of labor by means of original investigations. Besides these, the Federal Census Office, the Bureaus of Statistics of the Federal Treasury and Agriculture Departments, the Bureau of Foreign Commerce of the Department of State, the departments and boards of agriculture of the various states, and various other offices may be considered as publishing labor statistics in some degree. But I speak here of the value and influence of those offices first mentioned--those devoted specifically and technically to the investigation of social and industrial conditions and to the publication of distinct labor statistics. These offices had their foundation in the establishment of the Massachusetts bureau in 1869. Gradually other states created bureaus of statistics of labor, and in 1884, the United States government added its own office to those already in existence. All the offices, together, have published over 40 octavo volumes, covering a great variety of topics and the results of investigations relative to almost every condition and environment of the working man.

The character and quality of the work of the different offices varies in some degree, due to a considerable extent to the selection and tenure of the heads of the different bureaus. Where the governor of a state has allowed himself to ignore politics and insist upon scientific work, the bureaus have achieved the greatest success; but as a rule a governor feels that the office of the chief of the bureau of statistics of labor of his state must be filled with somebody from his party, without reference to the skill, the experience, or the integrity of the incumbent under the previous administration. Yet I am glad to say, as the result of pre-

*Revised from an article in the *Engineering Magazine* of November, 1893, with the consent of the publishers.

study of the reports of all the officials who have done duty in this country during the past thirty-two years, that no matter at what reason they were appointed, no matter how inexperienced in the work of investigation and of compilation and preparation of statistical matter, no matter from what party they came, and whether in sympathy with capital or with labor, and whether holding fairly radical socialistic views—the men have, without exception, at once comprehended the sacredness of the duty assigned them, and have served the public faithfully and honestly, being content to collect and publish facts without regard to their individual bias or their individual political sentiments.

As soon as a man realizes that he is giving to the world a service, he feels the necessity of accuracy, and that to distort the information collected would be to commit a crime worse than any ordinary crime, because it would mislead legislators and others and fix a bad example in the history of the state. Many men, too, have entered into the work of the statistical bureaus feeling that they could use them as the means of propagandism in some way, and in a few cases this has been attempted, but almost always with failure, because bureaus are looked to to furnish information as to actual conditions surrounding industry.

What I have said is true is illustrated by other countries. In the example of the American states. Great Britain, France, Belgium, Austria, New Zealand, New South Wales, Canada and the Province of Ontario, Canada have established bureaus following in their duties very closely those assigned by the American bureaus and departments. In Germany, and Sweden labor statistics of the same character are published by general statistical bureaus. A distinguished member of the House of Commons of England told me a few years ago whenever he wished to lay any facts relative to workingmen before his colleagues, he carried into the House some American report on the statistics of labor. In the Chamber of Deputies of France, in the German Reichstag, and in the legislative bodies of other countries the American labor reports have been freely used in economic discussions. Had not the work of the American bureaus been highly regarded, these things would not have occurred. It is true, of course, that the sentiment of the times is largely conducive to the successful operation of bureaus of statistics and labor. The general attention paid to social and industrial conditions and all conditions affecting the environment of men has fertilized the soil for statistical seed. The altruistic spirit of this

age calls for accurate information, that it may know how best to expend its efforts and not dissipate its energy. The question is constantly being asked: "What do social classes owe to each other?" and that any one class may not be deceived in the nature or magnitude of its debts, it must turn to statistics to ascertain the true situation.

The question is often asked, and by very intelligent people: "Of what good is a bureau of statistics of labor?" Does the workingman secure any direct benefits from its existence? This question cannot be answered very specifically, any more than could one asking for the direct benefits of the public school. It would be a difficult process to show how a dollar more is made to enter the pockets of the working people through the existence of public schools, or any other educational institution, and yet all men will admit that the sum of benefits is largely increased by the existence of schools. Personally, I have always contended that the bureau of statistics of labor, wherever it exists, is simply a part of the educational machinery established by the community through which it is enabled to know more of itself. "Know thyself" is an injunction which should be applied to communities as well as to individuals, and it is only through rigid, impartial, and fearless investigations that any community can know itself in many directions. Notwithstanding this general view of the educational influence of the offices I am considering, very many instances of their specific influence can be cited. These instances I must, for purposes of convenience, draw largely from those which have come under my own observation or within my personal knowledge, for to enter upon a research of all the influences which have come in direct ways from the services of all the offices in existence in this country would take me too far afield.

One of the first results that I remember, as being traceable to a published report, related to the tenement-house system of the city of Boston. In the second, third, and fourth reports of the Massachusetts Bureau of Statistics of Labor there were many facts showing the condition of the tenement-houses in the city named. The public was fully apprised of the misery that existed in them, resulting from bad conditions, ill construction, and all that tended to make tenement-house life an evil. Public attention was aroused through these publications, better laws were framed and passed, and a public sentiment created which crystallized in a reform movement having for its purpose the improvement of tenement-houses in Boston. Some of the work

were improved, and the impetus then given is still active, shown by the existence of societies in that city and their success in securing from the legislature an appropriation to the bureau in that state to make a very exhaustive investigation covering every tenement of whatever grade in the city of

bureaus everywhere, whenever conditions warranted it, investigated the subject of child labor and shown to the public all the facts connected with such employment, the evils it entailed upon the community, and the methods which could be adopted to for its reduction, and everywhere, too, the results have been beneficial. If the bureaus had never accomplished anything else than the marked reductions in the number of children—those under ten years of age—who are employed in mines and workshops, they would have amply repaid the cost for its expenditure in their equipment and support.

The publication of information relative to the inspection of mines and workshops in England and other countries, together with statistics showing the necessity for such inspection in this country, has led in several states to the establishment of boards of factory inspectors. These boards have committed to them the execution of all laws providing in any way for the benefit of those who have to work in any kind of productive establishments. These inspectors enforce the laws concerning hours of labor, the employment of women and children, the guarding of machinery so that the operatives may be more secure from accidents, and in all ways undertake the enforcement of laws of the character specified. Through these efforts (and they were largely induced by the reports of labor statistics) child labor has decreased, accidents have been reduced in number and severity, the hours of labor have been shortened and regulated, and so all along that line of facts the influence of the reports of the bureaus has been enormous; the value of their work cannot be expressed by figures.

The first ten-hour law in this country was passed by the Massachusetts legislature in 1874. The statistics published by the bureau of that state helped the passage of the law in a marked manner, and saved its repeal in later years. The manufacturers, when that they were brought under the ten-hour law so far as women and children were concerned, felt that the manufacturers of neighboring states ought to be brought under like laws or the Massachusetts law should be repealed, for they claimed, as

was claimed in England years ago, that in working under a ten-hour law the manufacturers of Massachusetts were placed at a decided disadvantage relative to the manufacturers in the surrounding states. The legislature therefore directed the Bureau of Statistics of Labor to investigate the subject of the hours of labor in that state and in the other New England states. The result of the investigation showed that, under a ten-hour system, the Massachusetts manufacturers paid more wages than those of the other states, where eleven and twelve hours were the rule; that they produced more goods on any basis that could be named whether per individual or per machine; in short that in every respect the Massachusetts operatives were under better conditions than those of the surrounding states. There has been no attempt since that report was published to repeal the ten-hour law of Massachusetts. On the other hand, other states have followed suit, until now that system prevails generally in the United States.

The bureaus have been very influential in securing a modification of the old common-law rule relating to the liability of employers for accidents occurring to their employes. Under this rule a workman cannot recover damages for injuries received through the carelessness or negligence of a co-employee, although a stranger might recover damages for an injury following the same carelessness or negligence; as, for instance, under the old common-law rule, a brakeman on a train running perhaps 500 miles could secure no damages from a railroad corporation in consequence of injuries received through the carelessness or negligence of a switchman along any part of the line, although the brakeman knew nothing of the switchman, had no knowledge of his skill or capacity when he engaged with the company, and in no sense of the word, so far as reason is concerned, could be considered the co-employee of the switchman; yet, although this common-law rule grew up before great industrial enterprises were established, judges had adhered to it and had ruled that in such a case as that just mentioned the switchman and the brakeman were co-employees, and therefore the employer could not be held liable. The agitation for a legislative change in this common-law rule in England resulted in the enactment of a law in 1880 changing or modifying the rule, and, in this country, the matter being taken up by bureaus of statistics of labor, several legislatures have been convinced of the justice of a change, and have therefore made it; the dire results which were predicted

follow the change of the rule have not followed. In this the bureaus have done a great service, not only to the employees of railroads and corporations engaged in productive work, but in securing the public against the employment of idler men.

Another very emphatic influence which the bureaus have exercised is in the abolishment or modification of what is known as the "truck store" system, or, as it is more popularly known in many parts of the country, the "pluck-me" method of store.

This system consists in the establishment of a store by the proprietors of a works for the supply of its employees. Usually, in many instances, the prices charged at these stores are much higher than those charged at other places, and so the employer of a concern having a truck store was almost compelled, in many instances actually compelled, to purchase the necessities of life for his family at an exorbitant price, whereby the employer made a second profit on the labor of the employee. In many instances the workmen of such an establishment did not draw any money from one year's end to another. The pay for goods purchased in the store was secured by the payrolls, and the debts and credits left no margin on pay-day. Early in the history of bureaus of statistics of labor this system was exposed through the statistical method, and the result has been that in every many states laws have been passed making it a crime to carry on such a system, in some cases, to carry on such a system, and in some cases making it the duty of the proper officers to see to it that such systems were regulated. The evils of the truck-store system have not yet been entirely eradicated in this country, but the work has been great, and the value to the wage receiver of the system is of great importance.

In this connection I might mention the influence which the bureaus have had in securing more frequent payments for the wage man. Formerly the payments were monthly. Under the new system the credit system grew also, because without ready cash the wage receiver must secure credit of his grocer, and the employer, under such circumstances, looks out that the charges are sufficient to cover the delay in receiving his money or the losses that may come through his endeavors later on to collect the balance of his bill of the employer through the trustee or the bank system. Weekly payments have been shown by the bureaus to be beneficial in eradicating some of the evils of the credit system.

In some of the western states there have grown up during past few years some of the most rascally practices on the dulity of the working man that have ever been known. They are robberies of the meanest sort, for they not only rob a man of his money, but in many instances of his manhood. The practice I refer to is that of a certain class of employment offices, located usually in the rear of some beer saloon, which advertise that a large number of men are wanted for labor in a certain city, usually almost always at a distance. In a western city one of these offices advertised for one thousand men to proceed immediately to Washington, D. C., where employment would be furnished at \$1 per day. Hundreds of men responded to this advertisement. They were obliged to pay down \$3 or \$4, as the case might be, as the rascality of the manager might demand, and then they were put off by various excuses for several days, until they began to clamor for their contract. When they became too demonstrative, the manager would pay back a part of the sum advanced, for the sake of integrity. Meantime, however, the hundreds of men, loafing about his beer saloon, had expended more or less money for beer, in addition to the fee paid for supposed employment. In one city an advertisement appeared for a large number of men to be shipped to Iowa, while in another an advertisement appeared for a large number of men to be shipped to the very place of the first call. The bureaus in some of the states where such practices have been carried on collected the information relative to these offices, and exposed the swindle perpetrated upon the wage receiver. Much good was derived from these reports, and, in addition to the laws in existence, others of a more stringent nature followed.

These instances of the direct influence and value of bureaus of statistics of labor are sufficient, it seems to me, to put beyond any question their right to exist, their right to the sympathy and support of the public, and their right to ample equipment and means for carrying on their beneficent work. But they have another office to perform, which is one of the leading offices of statistics in every direction, and that is the correction of false impressions and the removal of apprehension, and two or three instances of this kind may perhaps be of service.

The statement is usually made by writers on the labor question from the capitalistic point of view that the prosperity of the savings banks of the country represents absolutely the prosperity of the workingman—that the total amount of sav-

banks clearly indicates the prosperity of labor. I am not
d to question this statement, so far as it applies as a prin-
t I question the degree of accuracy contained in it, for
stigations have clearly shown that only about one-half
deposits in the savings banks belong to men and women
in manual labor or in the toil necessary to the produc-
goods. Such a fact, properly brought out, simply sets
thoughts in the right direction, although it does not dis-
se sentiment underlying the erroneous sentiments regard-
conditions involved.

78 a great deal was said about the unemployed in this
It was reported, and the report was very industriously
d, that there were from 200,000 to 300,000 people out of
ment in Massachusetts, 40,000 in the city of Boston alone,
0,000 in the United States. These figures were quoted in
ers, works on political economy, speeches in Congress,
resolutions, etc., until they came to be believed every-
nd yet no attempt was made, officially or otherwise, to
the real facts. The Bureau of Statistics of Labor of
ussetts undertook to make an investigation of the subject,
it did at two separate canvasses, one in June, 1878, and
r in November of the same year. The result showed that
Commonwealth, on June 1, there were 28,508 skilled and
d laborers, male and female, out of employment, seeking
ant of work, and that in November there were not more
000 of the same class. On these bases there could not
en over 460,000 unemployed able-bodied men and women
nited States, ordinarily having work, out of employment
ime mentioned. The report further showed that in the
ntioned there were in 1875 only 316,459 persons engaged
nufactures and mechanical industries, in occupations upon
ey depended for support, whether actually employed or
the whole number actually employed in the manufactur-
mechanical pursuits of the state was 308,963. If, there-
re had been 200,000 or 300,000 persons out of employ-
the state in June, 1878, as the alarmists were in the habit
g, there could have been hardly any left in the factories
k shops of the community. The figures published by the
were used all over the country, and completely reversed
ular belief relative to the vast number of the alleged unem-
n the country.

think one of the most striking instances of the removal

of false impressions from the public mind relates to mortgage indebtedness on real estate. In a speech made in Congress May, 1888, the statement was quoted from an agricultural paper that the estimated mortgage indebtedness of all real estate in Ohio at that time was \$701,000,000; in Indiana, \$398,000,000; in Illinois, \$620,000,000; in Wisconsin, \$250,000,000; in Michigan, \$350,000,000; in Iowa, \$351,000,000; and statements were made for other states. The Ohio and Michigan Bureaus of Statistics of Labor undertook to investigate this subject, through the offices of the register of deeds, the boards of assessors, etc., and in these two states the mortgage indebtedness, as established and estimated by the Commissioners of Labor, was, for Ohio, \$330,999,205, and for Michigan, \$129,229,553, instead of the amounts popularly claimed. Under the federal census of 1890 an investigation was made relative to mortgage indebtedness, and the facts established with remarkable accuracy for the other states just named. By the investigation of the census it was shown that in Indiana the mortgage indebtedness is \$110,730,643; in Illinois, \$384,299,150; in Wisconsin, \$121,816,168; and in Iowa, \$199,774,171. It is a little remarkable that the sums accepted in a popular way for the mortgage indebtedness of the states named were in some instances exactly the valuation of all the property of the state. The extravagant figures quoted were used all over this country and in Europe, wherever capitalists were seeking investments in this country. The figures did immediate harm; the wrong cannot be calculated; but as time goes on the statistics emanating from bureaus of statistics of labor and from the census office are removing the apprehension which grew out of the original statements.

Another feature relative to mortgages relates to the causes which mortgages are placed upon farms in the western country. It has been claimed in recent years that the great mortgage indebtedness of western states is due largely to disaster or adversity. The Commissioner of Labor of Nebraska undertook to satisfy himself, by positive investigation, as to the truth or falsity of such claims, and he took as the territory for his investigation the county of Sarpy, covering the period from December 31, 1879, to January 1, 1890. Sarpy is one of the oldest counties in Nebraska, and therefore offered the best opportunities for investigation in the state. The result as to the causes for the creation of the mortgage indebtedness of the county is shown in the following statement taken from Commissioner Jenkins' report for 1889-90:

Purchase money..... 58.00 per cent.

permanent improvements.....	3.00 per cent.
change of stock.....	4.00 per cent.
to meet personal obligations.....	.50 per cent.
invest in real estate.....	7.00 per cent.
invest in mercantile business.....	20.00 per cent.
business.....	.25 per cent.
known causes.....	7.25 per cent.

showing that all the mortgages from sickness and from unknown causes were the result of misfortune or of adversity of kind, the foregoing table shows that 92½ per cent. were for definite causes and such causes as indicated prosperity rather than adversity.

An investigation under the eleventh United States census commands the object of indebtedness for 102 selected counties in various states, the results being obtained by personal inquiry from the experts of the office. That investigation is a clear and emphatic corroboration of the results arrived at by Commissioner Jenkins of Nebraska. It shows that to legitimate objects, showing clearly prosperity and advancement, 94.37 per cent. of mortgage indebtedness of the 102 counties considered must be attributed.

The convict labor question is one that has attracted a great attention during the last quarter of a century, but it was until various state bureaus and the United States Department of Labor collected exhaustive statistics relative to productive employments in penitentiaries and other penal institutions and the effect of different systems of employing convicts that the discussion took intelligent shape. There has been much discussion along the lines of convict labor. Many states have made experiments which have been abandoned, while others have introduced new systems which are progressing favorably; in the work the contributions of labor statistics have been of the greatest possible value.

The advancement of technical science, too, has been greatly aided by the exhaustive publications of different departments and bureaus of statistics of labor relative to industrial education. It is only recently that the different states of the Union have felt it incumbent upon them, through their legislatures, to study all the phases of industrial training, consisting of manual training, trade school instruction, and the higher technological or university work which is done in our institutes of technology. The United States Bureau of Education has aided the discussion and consideration of such matters, and its work

has been grandly supplemented by the state bureaus and United States Department of Labor. It is now possible to discuss the question of industrial education in all its phases not intelligently, but on the basis of practical experience in this and other countries.

These few instances show the enormous value of statistics in removing apprehension and in correcting erroneous views. The money value of such information is not easy to calculate.

In september, 1883, the heads of the few bureaus of statistics of labor then existing met at Columbus, Ohio, and organized the National Convention of Chiefs and Commissioners of Bureaus of Statistics of Labor. Since then these officials have met annually for the purpose of discussing statistical methods, the best way of collecting information and of tabulating, analyzing and presenting it. It was one of the early dreams of the founders of this convention that some uniform contemporaneous work could be undertaken by all the bureaus in co-operation. This dream was fraught with many difficulties. States did not organize their bureaus at the same time. Many of the subjects which had been covered by those organized at early dates formed the subjects of investigation of those which had been established at later dates, and hence there was a conflict; for the earlier bureaus did not wish to cover again what was new and important to the more recently established ones. Another difficulty arose in the fact that the industries and conditions of the state were not common to all states having bureaus of statistics of labor. Notwithstanding the fact that the original idea has never been and cannot be carried out, the convention has been of the greatest possible value to the different states. At each annual meeting each commissioner of labor reports the investigation he has in hand, the methods he has adopted for obtaining the information desired, and all the difficulties and complications attending his work. These matters are then discussed and the experience of older commissioners brought out for the benefit of those who have more recently come into the work of gathering statistics of labor. Thus great advantage is given to even the older commissioners to gain fresh inspiration from the troubles and difficulties of those who are new to the work. The convention also helps to call public attention not only to the value of the statistics of labor, but to the methods of the work being conducted.

Notwithstanding all that I have said relative to the value and influence of the statistics of labor, I am perfectly well aware

ould be made of far greater value; but that greater value
ly be secured through the direct action of the legislative
s behind the bureaus. They are very poorly equipped.
need more men and more money. They need experience,
can only come through the influence of the executives of
ates. With a longer tenure of office, and an increase in the
ment and means of the bureaus, their futnre usefulness can
de to far excel that of the past and of the present. The
of work which they can undertake are numerous and inex-
ble. Knowledge of production is absolutely essential for
justment of many of the difficult questions we are facing
y, and any contribution, through statistical investigation or
wise, that will enable both the capitalist and his employe to
clearly understand the real conditions of production should
lcomed by all elements of the community. The bureaus
be kept in the future, as in the past, free from partisanship.
statistician is not a statistician when he is an advocate, no
r how skillful he may be in the manipulation of figures.
ust be impartial; he must make his investigations without
ference to theories to be proved or disproved, and give to
orld the actual results of his inquiries. This country lacks
d statisticians. We have no means for training them,
t in the practical work of the statistical offices of the state
ederal governments. These offices, therefore, become a
for the future, and the statisticians of this country that
be of great service to the governments must acquire their
edge through the statistical offices; but no work can be
plished successfully without money and without men. We
look, therefore, to the legislative branches of our various
ments for the increase of the usefulness and for recog-
influence of our bureaus of statistics of labor.

SOME OF THE ECONOMIC AND INDUSTRIAL PHASES
OF
THE AMANA SOCIETY OR THE COMMUNITY OF TRUE INSPIRATION.

BY BERTHA H. SHAMBAUGH.

The information embodied in this article has been collected by the author during personal visits to the several Amana villages within the past two years. The statistics given have been furnished by members and officers of the Society to whom the author desires to express her sense of obligation. Mr. Abraham Noe, secretary of the Board of Trustees, to Dr. Charles Noe, physician at Amana, and to Mr. John Haas, Sr., one of the elders of the Society, the author is deeply indebted for their courteous assistance. The manuscript for this article was submitted to the Society before publication.

HISTORICAL INTRODUCTION.

In Iowa County, southeast of the center of the Commonwealth of Iowa, there is a group of seven villages bound together and surrounded by 26,000 acres of Iowa's richest prairie land. This little garden spot of Iowa is the home of the Amana Society, which it is "known in law," or, as it is called by its members, The Community of True Inspiration.

This community was not founded by a social reformer or political agitators. It is not an attempt to practice a systematic economic theory. But it is rather the outgrowth of a unique effort of a small band of German peasants to live honestly according to the promptings of their own consciences.

As a religious organization the community had its beginning in Southern Germany two centuries ago, where its members, after the fashion of the age, suffered persecution and exile for the promulgation of their religious doctrines. Naturally banded together in those troublesome times for mutual comfort and protection. In order that the little band might be fed and clothed it was resolved to rent enough land in common to make a profitable occupation to each member of the group. And here lies the beginning of their communal economic life. The failure of crops, the heavy rents, and the severity of the govern-

the leaders of the community to seek a new home in a more promising land to promote their "temporal and spiritual welfare." A committee of four was sent to America, where, after numerous voyages, they selected a spot near Buffalo, New York. Here in 1843, Ebenezer, their first village of a communistic nature, was laid out. Two more villages were soon established and 800 persons of the faith came from Germany to join the American colony.

After a twelve years' residence in New York, the elders of the Society decided it would be for the best interests of the community to relocate on the frontier where land was cheaper and opportunities were better for development. The present location in Iowa County, Iowa, was selected by the committee set out by the Society; and here they have lived in peace and quiet for half a century. The little handful of Inspirationists from Germany struggling to pay the rent of their first estate has developed into the prosperous Amana Society of today with 57 members owning 26,000 acres of land and operating numerous mills and factories whose products find a market from Maine to California.

Thus it will be seen that Amana Society is not a creation; it is the product of gradual development. It has not been elaborated out of Utopian speculations; but it is the result of a long united effort "to live soberly, righteously and godly in the present world."

SOCIAL AND POLITICAL ORGANIZATION.

The permanency and the prosperity of the Amana Society is largely due to its perfect organization. The entire conduct of the affairs of the Society rests with a Board of Trustees consisting of thirteen members who are elected annually by popular vote³ out of the number of elders in the Community. These trustees elect annually out of their own number a President, Vice-President, and Secretary. All contracts are made by the Board of Trustees, which has, in short, all the rights and privileges of an ordinary corporation. In the month of June in each year the trustees submit to the voting members of the Society a full statement of the real and personal estate of the Society."⁴

"Alle männliche Glieder, die die Constitution unterschrieben haben, so auch Wittwen und solche weibliche Glieder, die über dreiszig Jahre alt

³A Brief History of Amana Society or Community of True Inspiration, 1844-1900, by Dr. Charles F. Noe and Mr. Geo. Heinemann (members of the Society), published by the Society.

⁴Constitution, Article IV.

sind, und nicht durch ein männliches Glied repräsentirt sind, sollen Wahlberechtigt sein."—By-laws.

It has been the policy of the Society to re-elect from year to year those officers who have satisfactorily fulfilled their duties. The present officers have served nine years.

In each village there are from seven to nineteen elders, who are appointed by the trustees from the older and more spiritual and inclined of their members. To the elders of each village is entrusted the management and control of the affairs of that village. It is this group of elders in each village that assigns to each member his apportioned task, his dwelling, etc. And to this group of elders each member desiring more money, more house room, extra holiday, or easier work, must appeal; for these allotments are as occasion requires "revised and fixed anew."⁴

Every branch of service has its superintendent or "boss," appointed by the elders, and to whom the separate groups of workers are responsible, and who are in turn responsible to the Society.

The system of government is then a sort of federation where each village maintains its local independence, but is under the general supervision of a governing central authority, the Board of Trustees.

Each member of the Community "is in duty bound to give up his or her personal and real property to the Trustees for the common fund, at the time of his or her acceptance as a member, and before the signing of the constitution. For such payments into the common fund each member is entitled to the credit thereof in the books of the Society and to a receipt signed by the President and Secretary of the Board of Trustees, and is moreover secured for such payments by the pledge of the common property of the Society."⁵ These contributions to the common fund of the Society have varied from \$50,000, the largest sum paid into the treasury by any one member, to the bare working capacity of the ordinary laborer.

Every member is entitled to free board and dwelling, to support and care in old age, sickness, and infirmity and to an annual "share of maintenance," the amount of which is fixed by the Trustees. "In consideration of the enjoyment of these blessings" the members release all claims for wages, interest, and any share in the income and of the estate of the Society separate from the common stock.⁶

⁴Constitution, Article VI.

⁵Constitution, Article V.

⁶Constitution, Article VI.

members withdrawing from the Society are entitled to receive the moneys paid by them into the common fund and to abstain thereon at the rate not exceeding five per cent. per annum from the time of the adjustment of their accounts until the repayment of their credits, which rate is to be fixed by the board of trustees.

Amana Society is first and foremost a religious organization. Communism is a means for the better development of a spiritual life and "is not practiced for temporal or pecuniary purposes or as an experiment to solve social problems."

Because of the high standard of membership the increase from the outside has been slight during the past quarter of a century notwithstanding a large number of applications. New members after having given proof of being fully in accord with the religious doctrines of the Society usually have to go through a period of probation. The fact that all religious exercises are conducted in German makes it necessary that those desiring to become members be fully conversant with that language.

The membership of the Society during its residence in Iowa by decades is as follows:—

January 1st 1861.....	572 members
January 1st 1871.....	1466 members
January 1st 1881.....	1521 members
January 1st 1891.....	1688 members
January 1st 1901.....	1767 members

The present population grouped according to ages is as follows:—

Number under five years of age.....	187
Number between ages of five and fifteen.....	288
Number between ages of fifteen and twenty.....	131
Number between ages of twenty and sixty.....	840
Number over the age of sixty.....	321

The number of births during the past ten years was 362; the number of deaths 272. Of the number of deaths but one was by accident and two by suicide.

Defectives (the insane, blind, feeble-minded and deaf-mute) for the most part sent to the state institutions for treatment, there are no special hospitals in the community. The milder cases are, however, cared for in their own homes.

Constitution article VI.

A Brief History of the Amana Society by Chas. F. Noë and Geo. Heineken.

Ibid.

THE VILLAGES.

The seven villages of the Society popularly known in Iowa "The Colonies" are: Amana, the capital and the oldest and largest of the villages; East Amana; Middle Amana; "Amana before the Heights," or High Amana; West Amana; South Amana, and Homestead. The first three villages named have one postoffice in common at Amana. The postoffice for West and South Amana is at South Amana; while High Amana and Homestead have postoffices of their own.

Homestead was a postoffice connected by a stage line with Davenport and Des Moines when the Amana Society first located in Iowa. The railroad was extended through in 1861, and it was during that year that the embryo town was bought by the Society.

The Chicago, Rock Island & Pacific Railway passes through Homestead and South Amana. The Chicago, Milwaukee & Paul Railway passes through Amana and High Amana. The station agents at the several Amana railway stations, and the four postmasters are all members of the Society. All of the colonies are within a radius of six miles from "Old Amana." They are connected with one another, as well as with most of the important towns and cities of the state, by telephone.

The villages are laid out after the manner of the German "dorf," with one long straggling street and several irregular shoots. The largest of the seven villages is Amana with nine hundred and seven houses for its 600 inhabitants. The smallest village is East Amana with thirty-two houses for its 140 inhabitants. Every village has its general store, its school and its church, Amana, Homestead and South Amana have hotels. At the railway stations there are grain houses and lumber yards. The establishment of hotels has been made necessary by the hundreds of strangers who visit the colonies every year. They come from the north, the south, the east and the west. Some come for recreation; for the colonies are delightful places in which to spend one's vacation. Some are interested in political and social science and come for purposes of "investigation" much to the amusement of the colonists. But the greater number come of sheer curiosity—to find out, as Charles M. Skinner expressed it, "What there is so darned private goin' on here."

The houses are two (sometimes three) story structures of frame brick or a peculiar brown sandstone that is found in the vicinity. It has been the purpose of the Society to construct the houses

like as possible—each as desirable as any other. The houses are all unpainted, the Society believing it to be more economical to rebuild when occasion requires than to preserve with paint.

The style of architecture is the same throughout the entire community—plain square structures with gable roofs. In the time when the houses are uniformly half hidden with vines only with the aid of a weather-beaten sign peeping out from beneath a wreath of grape vines or a cluster of roses that the stranger could distinguish the “hotel” or the “store” from the church, or the private dwellings.

Each village has its own saw mill for the working up of hard wood. The frame houses are for the most part built of hard wood on the principle that the best material is the cheapest. The lumber used is obtained largely from the Society's own timber

The Amana Society does not insure its property against fire. Each village has its water tower and fire engine, and every married man in the village is “ex-officio,” a member of the fire department. Although the loss by fire during the last twenty years has been between eighty and one hundred thousand dollars, the society still deems it a matter of economy to rebuild rather than pay insurance premiums.

THE LAND.

The land belonging to Amana Society is rich Iowa prairie land. This fact is highly significant; since mutual sympathy and common beliefs without economic prosperity are not the basis of union. Indeed the perpetuity of such a Society depends ultimately upon the environment of which it is the most important factor.¹⁰

The Iowa river furnishes the water supply for Amana. The water systems of the other villages are supplied by deep wells. The deepest well is 2,300 feet deep. And in addition to these there are six feet deep, from thirty to forty feet wide, and seven feet deep was dug in the early sixties to conduct water from the river to the mills and factories in the villages to the north. The canal runs through a lake covering about 200 acres which lies between Amana, the capital, and Middle Amana. The water of the canal is kept clear by a stream dredge which was constructed by the Society several years ago.

¹⁰Giddings, *Principles of Sociology*, p. 82.

Although the Society is still buying land, the manufacturing interests are so great that the Society finds it more profitable to rent some of its land than to devote the extra labor and capital to agriculture.

Exclusive of the rented and swamp lands the 26,000 acres belonging to the Society are divided approximately as follows:

Acres, timberland.....	10,000
Acres, cultivated fields.....	7,000
Acres, grazing land.....	4,000
Acres, occupied by villages and factories.....	500
Acres, vegetable gardens.....	100

AGRICULTURE.

The general plan of the field work is determined by the Board of Trustees, but a field "boss" or superintendent is responsible to the Society for the proper execution of their orders. He sees that the farm machinery is kept in order, he appeals to the elders for more men to work in the field when necessary, he obtains from the "boss" of the barns and stables the horses needed, etc.

There are from 175 to 200 hired hands, (outsiders and in some way connected with the Society), employed by the Society in the fields every year. Their hours of labor are from 6:30 to 12:30 A. M. and from 12:30 to 6:00 P. M. Their wages are from \$100 to \$175 per year, including board, room, heat, etc.

From fifteen to eighteen ox teams are used by the Society for the heavy hauling, it being the experience of the Society that they are better than horses for work which requires heavy steady pulling.

The products of agriculture are for the most part wheat (summer and winter), rye, barley, oats, corn and potatoes. The following was the yield for the year 1900:

Wheat	3,000 bushels
Rye.....	2,800 bushels
Barley	10,000 bushels
Oats	45,000 bushels
Corn	80,000 bushels
Potatoes.....	28,000 bushels

The Society makes no attempt to raise live stock for market. It buys and sells stock when the market is favorable but aims to have in the end only enough for home consumption.

The following is a list of the live stock of the Society for the year 1900:

Steers and heifers	95
--------------------------	----

rs	700
ses	225
ep	3,000
ine	2,000
iltry	

agricultural products and the dairy products are mostly
ned by the society.

MANUFACTURING INDUSTRIES.

ana's mills and factories were among the first erected in
ate of Iowa. The two flouring and grist mills, one at Old
a and the other at West Amana, were important centers
century ago for the pioneer farmers for fifty miles around.
the exception of one flouring mill in West Amana, which is
iles from the nearest railway, all of the mills and factories
the villages through which the railroads pass.

e Society is perhaps the best known in the business world
h its woolen mills—one in Old Amana and another in Mid-
mana—which have been in active operation for forty-two

Over half a million pounds of raw wool are used in the
n mills annually. As this is considerably more than the
sheep belonging to the Society can furnish, a great deal
raw material is purchased in the outside market. Formerly
imported from Texas, Colorado and other western states
rom Australia. Since the imposition of a high tariff on
o foreign wool has been used, and at present most of the
s bought in the Chicago market.

e latest and most improved machinery for woolen manufac-
s found in these mills. A number of inventions along this
ave been made by members of the Society.

e Society does not patent its inventions, as they are made
cilitate their own work and not for pecuniary gain. The
is that these inventions are copied from time to time by
outside world.

ere are about 125 persons employed in the woolen mills. Of
umber from sixteen to eighteen are outsiders employed by
ociety. Six or eight women (members of the Society) are
yed in the woolen mills. This is the only place in indus-
Amana, outside of the kitchen and the garden, in which
n are employed. Their work in the woolen mills is largely
work, such as tying threads as they are wound on the large

The women thus employed are those who are not strong
h or are too old to work in the kitchen.

One-half a million yards of flannel and ladies' cloth are manufactured in the mills annually, ranging in price from 20 cents to 85 cents per yard. Certain times of the year are devoted to the weaving of blankets, of which 5,000 pairs are made annually, selling at from \$2.75 to \$7 per pair. In addition to the above, 15,000 pounds of woolen yarn are made every year, selling on an average at 75 cents a pound. It has always been the aim of the Society to manufacture "honest goods," and they have found a ready market from the Atlantic to the Pacific coast. Ten men, seven of whom are members of the Society, are on the road in the interests of the woolen mills. Some of Amana's customers have bought their woolen goods from the Society every year since 1848.

The hours of labor in the woolen mills for the greater part of the year are the usual Amana hours of from 7 to 11 A. M.; and from 12:30 to 6 P. M. But during the summer months when the orders for the fall trade are being filled the mills run from half past four in the morning to eleven at night (the factories are lighted throughout by electric light.) In spite of the long hours and the busy machinery there is a very unusual factory air about the Amana mills. The rooms are light and airy. There is a cushioned chair or stool for every worker "between times." An occasional spray of blossoms on a loom frame reflects the spirit of the workers. Here and there in different parts of the factory is a well equipped cupboard and a lunch table where the different groups of workers eat their luncheon in the middle of each half day. In the villages where the factories are located the boys of thirteen or fourteen years of age who are about to leave school are employed in the mills for a few hours each afternoon "to learn." If the work is congenial they are carefully trained and are given every opportunity to "work up;" but if this employment is not agreeable they are at liberty to choose some other line of work.

In "Old Amana" there is a calico printing establishment. The heavy cotton goods used here are manufactured for the Society in the southern states. Here 4,500 yards of calico are dyed and printed daily. The patterns for the calico are designed and made by a member of the Society. The colors used in the dying are chiefly blue, brown, or black. This "Colony Calico," as it is called, sells at from 7 cents to 10 cents a yard and is sold all over the United States and in Canada and is quite as favorably known as the woolen goods. There are from twenty-five to thirty-five

employed in the printing establishment, ten or twelve of whom are outsiders. The working hours are the same as in the mills.

flouring and grist mills employ about sixteen men, five or six of whom are outsiders. The working hours are from 7 to 12 o'clock and from 1 to 6 P. M. At present a large addition to the grist mill at Amana is in the process of erection. Most of the machinery used in the mills is purchased in the outside market and a large part of the manufactured products is sold to jobbers in this and neighboring states. A few years ago the Society paid a premium on white corn, and in two years time almost the entire corn crop of the vicinity has been replaced by white corn. The following is a rough estimate of the number of bushels of grain purchased in the market outside of the community and the products manufactured therefrom:

BUSHEL	PRODUCTS.
10,000.....	{ Flour Graham
5,000.....	{ Meal Hominy Grits Feed
1,000.....	{ Flour Graham
10,000.....	Pearl Barley

The industrial efficiency of the operatives in the Amana mills and factories is noticeably great to even the casual observer. The worker labors with the air of a man in physical comfort and freedom of mind, and with the energy of a man who is working for himself and expects to enjoy all the fruits of his labor.

Besides the mills and factories already mentioned, the Society owns and operates two machine shops, one at Amana and one at Middle Amana; one soap factory at Amana; and one printing and book bindery at Middle Amana. The job work for the printing and book bindery, the text books used in the schools, the hymn books used in the churches, and other religious books commonly read in the community are all printed at the Amana printing office. The Society publishes no newspaper or magazine, official or otherwise.

While water was the original motive power used in the mills and factories, it has gradually been supplemented by steam, so that during low water, or when for any other reason the water furnished by the canal is insufficient, all of the mills and factories can be run by steam.

In three of the villages, Amana, Homestead and Midway, Amana, there are licensed pharmacies. The quantity of drugs prepared for the outside market is not large, as no effort has been made to build up a drug trade. As a rule, only special orders are filled. Many physicians of the state prefer to get their supplies here rather than to send further east for them. The Societies were the first people west of Chicago to begin the manufacture of pepsin, and their manufacture is still considered one of the best in the market.

In addition to the aforesaid industries, each village has a shoemaker, tailor, harness-maker, carpenter, blacksmith, tinsmith, wagon-maker, etc. These tradesmen, as a rule, do not devote their entire time to their occupations, but only make and repair what is needed in their line by the people of the village. During the busy season they stand ready to be called to the factory or the field as circumstances demand.

DOMESTIC ECONOMY.

Each family in the community has its own house. Each member of the family has his own room where he is at liberty to indulge his own taste in decoration, and where he may ride his hobby and store his keepsakes without being disturbed. There is no crowding anywhere in the colonies. The same spirit that led these people to believe that the purity of the community could better be maintained with more villages and fewer inhabitants in a village has led them to provide plenty of room for their people. In addition to his livelihood each member of the society is entitled to an annual allowance of from \$25 to \$40. This allowance is fixed by the trustees "according to justice and equity."

The annual allowance for each member is made in the form of a credit on the books at the store of the village where he or she resides, and all the goods obtained at the store are charged to this account. Each member has a pass-book wherein each debit and credit is entered. At the close of the year these accounts are compared and balanced.

Each woman in the colony makes her own clothes, and each mother makes the clothing for her small children. The village tailor as a rule makes the men's clothing. The dress of both men and women is plain in the extreme. Utility and not adornment is the chief regard. There is nothing characteristic in the dress of the men aside from its severity. The dress of the women

er, can never be mistaken for anything but the Amana Fashions never trouble them. The dress of today is the as it was at the founding of the Society. Mothers and ers, grandmothers and granddaughters dress alike, not in ber grays of the Quakers nor in the more brilliant purples Amish, but in plain calicoes of gray or blue or brown. The s short and very plain; the skirt is long and full. An apron derate length, a "shoulder-shawl" and a small black cap etes the summer costume. The only headgear is a sun t with a long cape. The winter dress differs from this only g made of flannel; a hood takes the place of the sun-bonnet. rumental music and "worldly amusements" are forbidden Society; and so the German's natural artistic sense finds sion in the cultivation of flowers. There are flowers in nt yard, flowers in the back yard, flowers around the hotel e school house, flowers along the fences and about the g-posts. It is safe to say that nowhere in the state of re there as many blossoms per square foot in July and ugust as there are in the Amana villages.

re is no cooking done by individual families in the com- y. Each village has from four to sixteen large "kitchen- " where the meals are prepared and served. The colo- re not faddists in their diet in any respect. Most of their s raised by themselves and for themselves and is, there- f the best. On their tables are found the most delicious and cream, good bread and meat, and the choicest of and vegetables. Breakfast is served at 6 o'clock in the er time and 6:30 in the winter time, dinner at 11:30 o'clock, e at 6:30 o'clock in the winter time and 7 o'clock in the er time. Those who work at too great a distance from a n to return for lunch during the middle of the forenoon ternoon carry their lunches with them. Each kitchen is ntended by one woman, "the kitchen-boss," who is assisted ee of the younger women. These latter take their turn in ing to the diningroom, preparing vegetables, cooking, g dishes, etc. The older women do not cook in the n as a rule; hence it is necessary in some instances to hire rom the outside. The work in the hotel kitchens—ex- e of superintendency—is always done by hired help.

h village has its bakery, butcher shop, and dairy. Wagons hese places make the daily rounds of the village kitchens. e Amana Society is very thoughtful and considerate of its

women. In every department of service in which women participate the work is carefully apportioned to their strength. Women who have children under the age of three usually take their meals home from the nearest kitchen and are not required to take part in the general village work. During the summer months children between the ages of three and five are cared at the kindergarten, to enable their mothers to take part in village work.

In connection with every kitchen house is a vegetable garden of from two to three acres. Each garden is cared for by two or three women. This work is lighter than the kitchen work and the hours are shorter. Hence the garden work is allotted to the middle aged women. In this connection it might be well to repeat that according to the constitution each member of the Society is entitled to "support and care in old age, sickness and infirmity." Unproductive members of the Society enjoy all the privileges and the comforts that the community has to give. It is doubtful whether there are many places in "the world" where more tender care and respectful attention is given the aged and infirm.

EDUCATION: ARBEITS-SCHULE.

The Amana schools are public, not parochial, being supported by the township and sharing in the school fund of the township. The Amana township, which the society owns, is divided into independent districts with a school house in each village. They pay their own school tax, build their own school houses, and employ their own teachers. These teachers are all members of the Society and are well educated in both German and English. They attend the County Institute and are examined by the County Superintendent.¹¹ The wages paid them are \$30 a month for twelve months; but since they may not keep the money it is turned over to the Society. This amounts to simply a transfer of figures on the books.

Education in the Amana community is compulsory. Every child must attend school between the ages of five and fourteen. The sessions open early and close late, and there are no vacations. What would otherwise seem like a long tiresome daily session is broken up into three parts:—1 *die Lehr-schule*, when all the common branches are taught; 2 *die Spiel-stunde*, or hour of play, when the children romp and play their quaint little German

¹¹ "History of Amana Society by William Rufus Perkins and Barth L. Wick. Published by the University of Iowa."

; and 3, *die Arbeits-schule*, or manual training department. In the latter department, during the winter time, the younger boys and girls are taught to knit and crochet. One is surprised to see how many pairs of stockings and mittens these little folks can make during the year. The older boys usually go during this time to the different shops and factories for instruction in the various trades.

The older girls clean up the school-house and help in the domestic department. During the summer months, the children take care of the school premises in trim—cut the grass, care for the flowers, etc., or help in the garden or the orchards. The atmosphere about the school is more like that of a large household than that of the ordinary school. The perfect equality maintained has eliminated that shrinking timidity so common among school children. Each child has the air of a stock-holder in the institution. School discipline, as a care, is reduced to a minimum. When a community of men and women have for generations maintained the same high standards of living and of thinking, it is easy to understand why the school children of to-day are so uniformly well mannered and obedient. There are mischievous boys and giggling girls, but such types as make our city fathers grow old before their time are wholly wanting. No boy or girl has ever been sent to the State Industrial School.

The teachers in the school proper are all men, but there are women among the "working teachers." "Religious instruction is given by the men, and practical christianity is taught by the parents, and by the women teachers to children and young people. The confirmation and reception into the covenant of grace, occurs at the age of sixteen. It is a most solemn act, conducted in open service, when a vow is made in the presence of the whole congregation, as a public profession of faith and with God."¹²

In the religious life of the community we are not concerned in details. Suffice it to say that in their business relations as in their private life their aim is to "serve God according to His laws and His requirements in their own consciences, and thus to work out the salvation of their souls."¹³

ECONOMIC PROSPERITY.

Although farming and manufacture are not the end of the

¹² A Brief History of the Amana Society or Community of True Inspiration, 1714-1900, by Chas. F. Noé and Geo. Heinemann, p. 28.
¹³ Ibid., p. 23.

society's activity, nevertheless their economic life is most prosperous and successful.

According to the books of the Auditors of Iowa and Johnson counties the assessed valuation of all property owned by the Amana Society in the year 1890, was \$439,653.00. This assessment being based on $33\frac{1}{3}$ per cent. of the actual valuation makes the latter \$1,318,959.00. In 1901, the total assessed valuation of all Amana property in Iowa and Johnson counties was \$411,155.00. This valuation is based on 25 per cent of the actual value, hence the actual valuation of Amana property—real and personal—at present, is about \$1,644,620.00. The increase in the valuation of the property belonging to the Amana society in the past ten or eleven years has been something like \$325,671.00.

This increase in valuation is principally due to the advance in the value of land.

THE KINDERGARTEN AS AN EDUCATIONAL FORCE

(An address delivered by Prof. Francis E. Cook before the Seventeenth Annual Convention of the Officials of Bureaus of Labor Statistics, at St. Louis, Mo., May 23, 1901.)

PROFESSOR COOK: Mr. President and Gentlemen of the Convention:

I desire to say to you at the beginning that I do not know when I have experienced the amount of anxiety which oppresses me at this present moment. I realize so fully the importance of the short period that I have to address you here. If I succeed in telling this story to you as it ought to be told I shall have the gratification of having been the humble instrument in getting you to go back to your respective localities and advance this great interest of the kindergarten as one of the fundamental levers for the upbuilding of the condition of labor throughout the world.

"If there had been no kindergarten there would probably have been no manual training as an educational function," is a frank, generous, and modest acknowledgement of his indebtedness to the influences of the kindergarten by none other than Prof. Calvin M. Woodward, whose words you had the pleasure of listening to this morning, and who is the founder and promoter of manual training in America, an institution which has done a

so much towards the elevation and purification of our
ic ideals along the lines of industrial education. A
acknowledgement might justly be made to the kinder-
n the part of every other prominent feature of what,
the aggregate, has been designated the "new education,"
domestic science—observation, correlation, concentration
quite hackneyed with us and yet full of significance in
(ession) systematic science teaching, nature study or the
method of teaching primary arithmetic, and, above all,
t revolution which has taken place in the teaching of
reading, where the empty and mechanical word study of
has yielded almost universally to the natural, free, full,
t discovery and use of words in the expressing of facts
from the handling of objects or in the actual and inter-
ntemplation of things and processes. Now it may be
d that the rat, cat, and mat method of teaching primary
has been supplanted by one which no longer nullifies or
s the work of the kindergarten, but hospitably receives
entum, utilizes its inspiration, and builds upon its work.
it of Froebel has softened discipline by enabling it to
ugh channels of greater interest more rapidly and con-
owards the goal of self-help, voluntary individual effort
ood, and constructive power. In short, the kindergarten
d in the land and is affecting our entire educational
m from the bottom to the top; and no where more com-
han in the interest which is being manifested by teachers
t years in supplementary literature—that is, in the pre-
and use of graded English classical literature for the
upplementary reading.

we turn from the kindergarten to the kindergartner we
hold a spectacle big with promise for the future of educa-
he United States, as her example comes to be followed
d more by her fellow teachers in higher grades. Behold
her normal training school, as an artist doing her own
an artisan elevating herself to loftier planes through the
great literature, whereby her emotions are purified, her
cultivated, her intellectual vision is deepened and
ed by the contemplation of these lofty and universal
Her general, nay indispensable, example cannot in the
ut become as a great light in the darkness to illuminate
the valleys to the serene heights that can be reached
ough culture.

A notable fact in this connection is, that while the *of* of the kindergarten are being received and applauded in directions, while the results of the kindergaten are being generally approved, there remains a singularly tardy recognition of the source from which these benefits have flowed. The influence of the kindergarten are felt on every hand, but the kindergarten itself is either unknown or misunderstood. There still prevails the belief that a kindergarten is nothing more or less than a nursery for the custody of the children of busy but indigent mothers, or that it is a play-room for children where capriciousness is allowed to run riot at its own sweet will, or, with singular inconsistency, that it is a place where the spontaneous play of childhood is curbed and repressed in the interest of premature education and discipline, or that it is a field for fads of regressive growth (a charge to true in many misguided quarters, but absolutely foreign to the teachings of Froebel). Such beliefs are false as they are mischievous and misleading. They are worse than no beliefs at all, on the part of those who entertain them. Froebel was a genius, and the great point of his success is that he succeeded in the infinitely delicate task of harmonizing spontaneity and will discipline.

Another remarkable fact is that while the kindergarten has been received, adopted, and even incorporated into the curriculum and school systems of many of our sister states, in our own state of Missouri, on whose soil the American kindergarten movement had its origin, we have lagged behind in our appreciation of the benefits of this institution. Missouri, upon whose soil the free public kindergarten had its origin, has for more than twenty-five years confined its privileges to its birth place, the city of St. Louis, with the single exception of Kansas City, where in the last four years they have adopted six kindergartens, where they are successful and which bid fair to become permanent.

To me a supreme moment in the history of education was that when Dr. William T. Harris, the present Commissioner of Education, then Superintendent of Public Schools of the city of St. Louis, and Miss Susan E. Blow, founder of the free public American kindergarten, first met to consider this momentous question, fraught with so much of weal for the cause of education. Then were planted the seeds which have grown into all that is so substantial and abiding in what is called the "new education." She came with her splendid enthusiasm, native intelligence, and skill, fresh from the study of a kindergarten in its pr

He recognized in her equipment the very embodiment of profound pedagogic philosophizing, and she recognized in the very soul of her methods. Then and there theory and practice, perfect form and perfect system, united in the origin and promoting of this latest and most potent of educational reforms. That was more than twenty-seven years ago.

It has been said, with much show of truth, that Doctor Harris smuggled the kindergarten into St. Louis educational life. The citizens were not ready for kindergartens in those days, but to-day we no longer have to urge them to adopt the kindergarten. They now demand it with an urgency that is irresistible, and whenever a new school building is to be erected it is without saying that the architect must provide in his plans specifications for a suitable room for a fine kindergarten. To-day we have 120 kindergartens in seventy-two different schools. We have enrolled in our kindergartens 10,000 children, and in charge of them 221 kindergartners of the very finest type. They have at length become in all respects an integral part of our educational system.

Early in its history was organized by Miss Blow herself a Kindergarten Normal Training Class. This institution still survives and flourishes under the guidance of Miss Mary C. McCulloch, indefatigable, intelligent, and tactful supervisor of kindergartens of the St. Louis public schools, a position which she has held successfully for more than seventeen years. From this school have gone forth at different times those trained kindergartners who are doing noble missionary work throughout the length and breadth of the land. To-day the school numbers some seventy cadets. They have a two years' course. The completion of the first year's course entitles the graduate to a certificate which would make her a paid assistant in the schools, and the completion of the two years' course, a diploma which makes her a director. The aim of Froebel may be summed up in these four words—continuity, unity, self-activity and freedom a rubric well known to all good kindergartners. What they mean by continuity is to show the child a generic development or a seed germ, showing the steps by which through cause and effect it runs up from one state to another—a kind of evolution. They never miss that they get a continuity of progression and relation, not one that is a dead link, as the Herbartians do, in an endless chain of cause and effect, a transcendental will and a transcendental intellect. By continuity is meant unity not of aggregation, but organic unity—that

is to say, a unity which originates from and is composed of a self-activity which generates variety—the many in one; a self-activity not born of caprice and ministering to the same, but a self-activity which surrenders the willful self to those larger selves into which the child is born, those institutions of spirit—the family, society, the state, and the church—a self-activity, therefore, which, instead of encouraging the child to become capricious and willful, inculcates in him the lesson of subordinating his willful self to the general will of all; a freedom which does not mean license, but liberty within the law. Freedom is one of the great points of the Froebelian system. The rebels and the kindergartners. That is the end and aim that we have.

Having signified briefly something of the aim and purpose of Froebel, I shall touch for a moment upon the history, or rather the origin and use of the methods by which he proposes to realize these ends, and in that I shall largely quote from Miss Blodgett, almost repeating her words as near as I can recollect them, her ideas being so familiar to me from old acquaintanceship. I remember that she first speaks of man's destiny; that his destiny is to reach self-consciousness, and he is helped in this by three things—by nature, by his own activity, and by his relation to other men (in institutions, or in history). And, again, she says that man is born in unconsciousness and destined for freedom, and is always making the ideal real, making the abstract actual. Then she enlarges upon this, leading to psychical development. We feel before we think. We express those feelings in actions; those actions create deeds of some kind; these deeds are contemplated by the mind or by the intellect, and a certain emotion, a pleasurable sensation, is engendered at the contemplation of our own activity. This pleasurable emotion begets new activity, which makes a new creation, and that creature becomes the object of contemplation of the fresh intellect, which experiences a fresh feeling of gratification, and so on to the end of the world, from cradle to grave, without ceasing. We begin, we feel, we act, we contemplate, we create, we contemplate the object of our creation, which sets the wheels in motion again, and so on in a circular movement forever. This was the idea advanced by Froebel himself.

If this be true of the individual, it is also true of the human race. Man has developed in the same way. When men have felt more than they have thought, they have been driven to express those feelings in the form of symbolism, and so they have

the sphinx, the chimera, and a thousand and one mythical forms to express those emotions, concerning which they had not a very clear notion. I remember the definition of John Fiske, that a myth is the form which ignorance takes to account for phenomena it does not understand, and so imagination goes on and creates, through symbolism, these mythical forms, but does not pretend to explain their meaning, does not know their significance, takes them literally, leaves to the future the task of their interpretation. Froebel was the first educator (and the greatest) to notice this parallelism between the development of the race and of the individual. As the individual grows from his childhood and infancy, so the race had its childhood, its infancy, its middle age, its youth, and old age. Noticing this parallelism, and seeing how nations have acted, Froebel adopted symbolism as the great method by which he was to teach little children. He says in his preface that if the little child is to be taught fundamentally, it must be done in the form of symbolism, and so he presents his wonderful gifts and occupations, and these gifts and occupations I shall, in a moment, undertake briefly to explain to you. I shall enlarge upon, even at the expense of "carrying coal to Newcastle," for I may possibly be telling you something you are more familiar with than myself.

At the suggestion of your president, Mr. Wright, I shall now present to you this address, which was an educational paper first delivered in Memphis and in Chicago before assemblages of professional teachers, and which was designed to show the relation of the kindergarten on our higher work, an industrial revolution, and how the relation of the kindergarten to the industries. Specifically the purpose of Froebel's gifts and occupations. He has a third invention—and that I think was the most important of all his work—his mother play-songs, which were designed to throw the child into sympathy with the institutional society and the social order—and to make him appreciate and understand the beauty and dignity and purity of honest labor. This is one of the great cardinal doctrines, one of the strong arguments in favor of the kindergarten, and it is inculcated into the minds of the children at the very beginning—respect and affection for the honest laborer. The gifts and occupations of Froebel comprehend two-thirds of his methods, but, taking a hint from Goethe's *Wilhelm Meister*, he set his whole work to music, and music was the central idea—and the burden of all his

songs is unity—the one under the many, the unseen under the seen.

Froebel was the first educator to advocate clearly that there is a will and a heart susceptible of education as well as an intellect; that is to say, that not only the hand and the eye—what is called the physical—should be educated, but that the will and the heart were susceptible of and entitled to education as well as the intellect. This is manifest throughout his methods. He always provides for the will and the heart, and of course acts for the body constantly—for the disciplining of the muscles and of the senses; but this is chiefly manifest in his songs, where he has words for the intellect, music for the heart, and graceful and beautiful gestures, for the will, where the children undertake to imitate the actions they are singing about.

In the passage from feeling through action to thought, the æsthetic sensibilities of the child are cultivated in a thousand different ways. For instance, he is taught the lesson of symmetry and harmony and proportion; he is taught cleanliness and neatness of person and environment; he is taught harmony of color and tone, both in song and speech; he is taught symmetry of work; he is taught grace of manner; he is taught politeness, and through politeness and consideration for others his ethical culture begins. One of the great points of Froebel's system is the great force he gives to ethical culture. Through what may be called institutional sympathy the child is prepared for contact with the outside world—with the working man, with the business man, with the professional man, and with life. His little sympathies are dwelt upon, encouraged and brought out, and he is taught to respect for the great institutional world around him, and especially how to become a useful and effective member of that community into which he is soon to graduate.

I shall conclude this part of my address by speaking of conscience. Conscience has been defined—satisfactorily to me—as the criticism which the ideal is constantly making upon the real. It is the criticism which the "ought to be" is always making upon our "is." Thus conscience is susceptible of cultivation through education. How? By purifying and elevating our ideals and thus enforcing the criticism upon their actual realization. Conscience has been defined to be the bridge which leads from ethics to religion, which begins with a sense of community and leads into consciousness with the feeling or the knowledge or the conception that underlying the universe is a *person* and that for

ciples—that is, moral order, supreme idea, absolute harmonious force—are not religious categories, but that God is a religious category. The sooner the child is taught that under-lying is an intelligent *personal* Deity the better for him. That is Froebel's view of the case.

Sum up: The key to the aim of Froebel is unity, or the hidden under the seen—that is to say, the hidden under the visible by him “inner-connection.” The key to his method is the recognition of the parallel between the growth of the individual and of race.

The devising of the gifts and occupations and mother play-gifts is based upon the recognition of this parallelism—the parallelism of the individual and the race. As the race has progressed through symbolism, so each individual child must go through the same experience, if fundamental ideas are to be made clear to him. Froebel was the man who was successful in doing that most miraculous thing, the harmonizing of apparently irreconcilable antitheses of spontaneity on one hand and discipline on the other, and he succeeded in doing this by interesting the child in these very things which I shall now, at the suggestion of your president, try to elaborate to you. On this I take this occasion to make my acknowledgments of indebtedness to the great little book of my friend Mr. J. Snider of the Chicago Kindergarten Normal School, “The Psychology of Froebel's Mother play Gifts.”

The six little balls (indicating), rubber interior with worsted cover, are called the first gift, which is the very first thing given to the hands of the child. You see it has a little string and is held by that. The child wants to handle it, wants to use it as soon as possible. There is a sort of providence, a divinity, that seems to control it, and he wants to be the providence; he wants to control it. The ball is divine and gives its form to the child's play and the circular movement of the stars, and when the child sees it he begins to understand and to realize the firmament of the universe that way, and it is designed for that purpose. The cube is the second gift, and when man begins to create he makes the cube. The third gift is the ball, and the ball is simply this. It has center, it has radius, it has circumference, a surface. It must not be too large; it must be small enough for the child to get it into his hand. It is made for that purpose; it is elastic—and then returns. It is a tender little thing; there is an inspiration to love and to play with it. The child will roll it about and its movement

leads him to suppose that there is a principle of life in it. This is one of the strange things in connection with this. This is called the potential gift.

There are six of these balls. The first three are of the primary colors—that is to say, the blue, the yellow, the red. Then there are the three secondary colors—the orange, the green, and the violet. This is supposed to be, by the best critics—and I coincide with them—an error on the part of Froebel. These three have been thus complicated, and there is too much color, and this gets us away from the ordinary threes that run through natural subject, object, and returning to the same. That psychological movement is a marvelous thing. There is first emotion, then the activity, the expression, the comprehension by the intellect, and the returning to the subject. This ebb and flow is symbolized by three—the Trinity—and the Trinity runs through all the gifts except here; so we think this was a mistake. As the child moves with the ball he looks up to the sky above and sees that he is at the center of the horizon, and as long as he advances he is at the center. Every time he moves he changes the hemisphere above and around him and he moves back and forth, and around from right to left, and he carries his ball with him. He gets the idea that he is the center of things. He feels this ball and sees that it is round. He gets that notion, and it soon begins to run through his head that there must be a center and that he has got to maintain that center or it will not go round evenly. He gets center and radius, and after a while he sees that there is a radius on the other side, and he gets the diameter running across in different directions. The sole point of Froebel is continually to show how one thing grows out of another.

The very next thing is the second gift, which is the sphere, the cube, and the cylinder. We have made the child conscious of the sphere by means of the first gift, and when he takes up this sphere he has created it in his mind already. There are center, radius, periphery, or surface, and that is the sphere. The next thing is this cylinder (indicating), or, rather, the cube. The cylinder Froebel did not invent in this connection until just before he died (1852). He was always working on these gifts and adding something. We cut this sphere in four directions, and we have four planes and eight angles brought to a center. There is a point in the center, and the point is brought out explicitly. What is a cube? A sphere turned inside out; and that is the first movement the child goes through, with his hands, when

tes the cube. Of course, this cylinder is intermediate; it is sphere and half cube.

The third gift is nothing more nor less than a two-inch cube, so as to make eight little cubes of one inch. You see the wonderful significance of that—addition and subtraction. The child moves them apart, and he counts, and adds, and subtracts, and arithmetic begins. We also have a little geometry all the while; we also measure and have a little of elementary trigonometry. The child begins to make little things of these cubes, but the principal purpose of this third gift is that it gives him the square inch, the square inch, and the linear inch. *It is chiefly a measurer.*

The fourth gift is a very rich one. It is a little two-inch cube, so as to make eight little parallel bricks two inches long, an inch wide, and a half inch thick. This gift is used a great deal by the little kindergartners. It enables them to enclose. They build with them; they make a fence,—put these cubes inside and around them. This cube is solid and conservative. It can lie on its back. This little fellow, the brick, is full of life; it can lie on its side and do a great many things the cube cannot do. You see what we are doing. We are gradually going from a solid to a point—going back and creating these things, and leading up to the industrial occupations.

The fifth gift is also a very rich one. It is a three-inch cube, and we cut it through in two places, making three cubes. Then we cut at right-angles in the other direction, making twenty-seven cubes. Then we get a new form. We cut them diagonally, enough from one angle to another. Thus we get the triangle the first time—right-angled isosceles triangle. Furthermore, we cut the block into four triangles. They are all right-angled isosceles triangles. This is particularly the gift where numbers come in. With this gift we count back. With these little cubes we get one-eighth, one-fourth and one-half; and with these one-eighth, one-ninth and one-third.

The sixth gift is an advance. The great point is that there is a relationship between all these gifts. The first gift is, in a certain sense, the ancestor of all these other gifts, and although they vary and depart the connection is kept up. You have the three-inch cube just the same as in the fifth gift, and then it is cut to make twenty-seven little bricks, just the size of the other bricks of preceding gifts. In addition to that, you have the end cut down. Out of that you have made twelve little

square plinths an inch long, an inch wide, and half an inch thick. These plinths are used in architecture. Some of these little bricks are cut lengthwise into little parallelopipeds, and with this little gift of architecture we begin to make the Parthenon and the Greek temple. You see, however, that Froebel has not given us the *arch* yet. He was always dealing with crystals, which have straight curved lines. He also studied architecture, but the architecture which revived the architecture of Greece—simply the beauty brought up in this way (indicating) the architrave, the two columns, and the line across, but no arch. But here we have another gift—simply *curves*. We take a hollow cylinder and cut it into four parts, and then we take the scissors and cut these into eight parts, getting the curvilinear, which enables us to form the arch. The arch, of course, is Roman. It originated in Egypt, but the Romans *made use* of it. Then they took the Greek column and put it as an ornament merely upon architecture, and it was the Gothic architecture to use both the Greek column and the Roman arch—that is, to make them a portion of the structure, an integral part of it. Of course, the children go through all this. They take these little blocks and make a city. They build a house, a school, or a church, and surround it with a wall, and do all sorts of things in that way. They are constantly changing the form of these and recreating them.

The next thing we are going to do is to bring the child to a spiritual view of things—get him closer to the surface, line, and point. Of course, you know that the line and the point have no dimensions; they are simply imaginary things. But we have materialized them, as it were, for the little children, and made them a line and a point, and get the conception in that way.

I want to say why these are called gifts. It is not because they are a present to the children, but it is what has to be given by the instructor in order to enable the child to do his work. To get his mind into self-activity you have got to present him with something on which to make a beginning. The economy of educational work is that the child does not waste his time experimenting with imperfect material, but is given the absolutely perfect thing to deal with at the beginning. Time is saved, and that is economy. Not only that, but he is taught the great lessons of industry in that very connection.

We are going to take the plane out of this gift (indicating). We are going to slice the cube and get the plane. Here are some of the different planes we have been able to get out

se blocks. They are right-angle isosceles triangles. There have the circular surface, and here (indicating) we have little blocks that have been made out of these blocks.

The next step is to take the child to the line. We have made figures here with only two dimensions—length and breadth. Now we are going to withdraw the breadth and the depth or height, and leave only length. The line is either straight or curved, and with this gift he makes the different angles; and with these circles and these rings he makes all sorts of forms, and finally the concentric form. You see we are gradually moving towards the point.

Now we have the tenth and last gift, the point. The child has been brought from the cube clear down until he has reached the point. How do we materialize the *point*? We give him the bean. The story of vegetation—planting the seed, the growth, maturity, returning to the seed in the soil again—completes a circular movement. It begins with the germinal idea and comes back to itself again, just as I have stated. So we take this for the point, and from it create lines and angles. The child is going back to the beginning and recreating these things. He starts with this little bean. What is a line? Nothing more than a succession of points. This bean represents the point. The line is turned into the surface; the surface is turned into the solid form again, and the child recreates the cube and the sphere and cylinder.

The industrial part of Froebel's method—what we call the occupations, is very marvelous. After the child is taught these fundamental forms by his teacher he is to *make* them in the occupations; he goes right to work and *makes* these things. That is where industry begins. He models these forms, he weaves them—recreates, you might say, the whole natural and institutional world. He begins with what is called the "plastic occupation." He takes modeling-clay or wax, and makes all these forms over again. First, he makes the sphere with his little hands. The child should be given a tool just as soon as he can use it to advantage over the hand. The hand is all right, but you notice that it is not the hand-working people but tool-using people who have made the greatest progress in industry. The child shaves the cube down with a knife or some other sharp instrument into these little blocks (indicating).

The *industrial* occupation begins when the child starts to make these abstract magnitudes—that is, the point, the line and

the surface—because it is through these that he recreates his world. The first thing he does is to model in clay, just as he has done before, but it is an *industrial* modeling. He is modeling a surface.

The next step is to make the line. The first thing he does is to string a line of beads. He takes a string and puts a lot of beads on it. The bead is a little sphere, and the hole in it corresponds to the diameter of the sphere. Then he strings a cube and the cylinder, to show that there is a diameter running through the cylinder in the same way. He learns a great many valuable lessons of that kind.

He next makes the *point*, and that is done with his pencil. He takes a piece of paper and pencil, and he begins to make little dots—little points close together. He next takes a little sharp instrument and perforates the paper, and makes lines in this way. By these perforations he makes different shapes and forms, curved and straight. That is the second useful industrial occupation. After he has made the perforations he takes the scissors and cuts a line of paper. Now he is going to turn that line into a surface, and the first thing he does is to take little strips of paper of different colors and interweave them, making an artificial surface. The next thing is the development of the surface in weaving.

The next occupation is that of stitching, and here is a new work which shows how the children follow the line (indicated by the perforations). They stitch an outline, or, rather, enclose a surface in a line. This is the worsted. The next step is to turn a plane or a surface into a solid, and here sewing comes in. Sewing is a union of two surfaces stitched together. How? By means of points and lines. The next step is what we call box-work. The children make a little box, and then they intersect and divide it with partitions. They make concentric boxes, etc. They are constantly going back to a center, this generative point, which is really the essence, the *ego* out of which the whole system grows. This imaginary center or point is a most important idea.

Now we come to industrial *drawing*—that is, the “graphical” industrial occupation. This cube, made of sticks for edges and peas for corners, is empty. The only things that are real are the point and the line and the surface. There is nothing inside the solid at all. That gives the child his hint and intuition of *drawing*. What is he going to do in drawing? He is going to create all these forms and solids. He is going to see that the

ns in graphic industrial occupation. He gets that con-
of the emptiness of the solid and how it can be created
ing work. He therefore starts in the graphic industrial
ion, which is drawing, and his implement is the pencil.
lloved to draw with his pencil at first, and finally he finds
t he cannot do much in this way. He must have per-
e drawing. Froebel uses some papers that enclose little
for, this purpose, and in that way the hand and eye are
After that he is taught free-hand drawing, creating all
fferent basic forms, and then he is allowed to create at
free will and to draw the most beautiful things.

e songs and games of Froebel we have a wonderful and
ethical influence. As I have already intimated, they
the child with the great social world around him in which
, and I remember one little stanza that Froebel composed,
ection with his "Song of the Wheelwright;" it is a beauti-
g:

"Why does the child desert his play,
The craftsman's work to see?
Something within, and latent still,
Starts at each stroke of strength or skill,
Whisp'ring, 'work waits for me.'"

bel is constantly trying to connect the child with industrial
o make him love it through its beauty, its benefit, and its
ocial force. In the "Song of the Charcoal Burner" he tells
y of his occupation, and how, if it were not for him, we
ot have a good many things, and they learn to respect the
l burner. In the beautiful little "Song of the Carpenter"
ild a house with their fingers and thumbs and they thank
penter for it. They are taught that the Divine Carpenter
nd was good to us, and that they must love the God that
he world. The design of this great artist, this great genius,
hese songs was to educate them to better thoughts and to
te in them a respect for honest labor. The sociological
g of the kindergarten gets the child in sympathy with
y, with the trades, with labor, and make a useful citizen of

he year 1836 Froebel wrote a remarkable little work, an
called the "Renewal of Life," and in that he predicted that
ited States of America, strange to say, was the field best
on account of its principle of freedom, its true Christianity,
pure family life, to receive his message and profit by its

teachings. That these words were prophetic seems to be demonstrated by this wave of new education which I have spoken of and which is going over the land carrying the spirit of Froebel. Froebel was the first educator in this world to realize, and to embody, and carry out the idea that by teaching the will and heart, as well as the intellect, you do that which has later been expressed by the well known dictum of Dr. Woodward's, "send the whole boy to school." And when the good time shall come, I am looking forward to that—and come it will, when the heirs shall come into his own, and there shall arise a general recognition of the source, the true source and origin of all these elements in our educational reforms, then we shall realize more fully than we do before the significance of those words of Holy Writ—"A little child shall lead them."

MR. WENNERSTRUM: I would like to inquire at what age you start the children to the kindergarten.

PROFESSOR COOK: Froebel's age is four and five years. Our legislature has stupidly put the age at six, when a child ought to be in the primary department. We hope to get the age put where it was originally—five years. It was that when Doctor Hall was here, and was changed after he left.

MR. JOHNSON: I would like to ask the Professor what his experience is in regard to the effect of this attempt at early training on the physical condition of the child. I have heard it said that the effort to concentrate the mind, the effort to restrict the movements of the child, at so early a day had its effect in development, or rather in lack of development, in after life. Do you find that that experience is true, or that such training does in any way effect the physical condition of the child afterward?

PROFESSOR COOK: It has never been perceptible to me. Of course, the kindergarten has been in existence only twenty-seven years from the very beginning, and we can hardly judge its effect accurately upon the child, but I think the statistics in that respect are in favor of the kindergarten. There is no effort at concentration. It is play. The children enjoy it, and they are not kept at their little work long enough to make it tiresome. I think that the effects of the kindergarten on the children are wholesome.

MR. CLARK: The Executive Committee having invited Professor Cook to give this address before the convention, I feel that it should give him a bouquet of thanks. I desire to say that we have appreciated his address very much, and I am glad that

have it in print to distribute to our people, who are becoming much interested in this work as an educational force.

JOHNSON: I understand that you have established here municipal kindergarten. I presume that there are here private kindergartens conducted along the same lines, but without connection with or direction by any authority. Do you find there is any difference in the theory, general work, and result of your work as compared with that of the municipal kindergarten?

PROFESSOR COOK: I am glad you have asked that question. There are three styles of kindergartens—the stationary, the evolutionary, and the revolutionary; and most of these private kindergartens are revolutionary; they teach all sorts of absurd ideas which Froebel really never dreamed of, and that have nothing to do with his system of education. The stationary kindergartens are those which do not vary in the slightest from what Froebel said. The evolutionary kindergartens are those which adhere to the spirit of Froebel, but adjust it to new conditions.

ROSS: Has the effect been to reduce the number of private kindergartens.

PROFESSOR COOK: I may say that substantially there are no private kindergartens in St. Louis. There are a few charitable kindergartens which may be called private kindergartens, but they do not come up to the standard.

MANUAL TRAINING VERSUS TRADE SCHOOLS.

While many schools of engineering in England and America have incorporated more or less shop work into their curricula since 1880; and while in numerous instances in Europe and America manual labor had been characteristic of school experiments, a manual training school, properly so-called, was not established till September, 1880, when the St. Louis school was founded. Then, for the first time, in connection with a liberal course of study of secondary grade, a daily period in drawing and two daily periods in educational shop-work were incorporated. By "educational" I mean that the shop products had no intrinsic value compared with their value as educational agencies.

The history of this school is fairly well known. It has gone

smoothly on its way for twenty-one years, turning out every from forty to fifty young men who, to a certain extent, embody the idea expressed by the motto, of a cultivated mind combined with a skillful hand. I shall not speak of the attacks made on the theory and methods of the school, nor of the battles of defense which have finally resulted in the defeat and capture of all assailants. There are now no enemies of manual training; we have now to deal only with questions which arise within our ranks.

The last report of the commissioner of education gives a list of manual training schools, properly so called, as well as a fairly full account of the cases in which elementary manual training for boys and domestic science for girls have been incorporated as regular features in more or less of the lower grades. The number of these schools is up in the thousands. In foreign lands our American ideas have taken root, and the catalogue of the manual training school of St. Louis has been in part translated into French, German, Italian, Spanish and Portuguese. Not a week passes but I get letters asking for advice from educational workers in far off lands. They have come from the Sandwich Islands, China and Australia; and I saw in Paris evidence that certain educational methods and models first analyzed and arranged in St. Louis had found their way into nearly all the Barbary States of Africa.

As Professor Henderson says, none of us in the beginning could have predicted so complete a triumph in so short a time. There is abundant reason to be grateful.

To-day I propose to address myself to the discussion of a single question, which has arisen in connection with tool instruction. The question is this: Shall the average school boy, who is fourteen or fifteen years of age, receive, during two hours a day, a broad range of culture in a variety of shops intended to teach the theory and art of tool work upon woods and metals? Or shall he devote one-half of each day (*i. e.* four or five hours) to actually learning a single trade in a commercial shop, with a definite idea of becoming a journeyman mechanic when he leaves the school?

It will simplify the discussion somewhat to say in the beginning that the first method is the method of nearly all manual training schools with which I am acquainted; and that the second method is the method which is earnestly advocated by persons of long experience and wide observation, who are dis-

ed in the subject of the education of American youth, nt among whom stands Mr. M. P. Higgins, for many hop superintendent and instructor in the Polytechnic e, of Worcester, Mass. Mr. Higgins has elaborated his what he calls "half-time schools," which, in brief, is to one-half of each day to academic work in language, sci- d drawing, and the other half to the actual learning of a apprentices in commercial machine shops.

preliminary report of a committee of The Society for the on of Engineering Education explains Mr. Higgin's plan ws:

l-equipped and officered industrial works, as for instance, machine-tool or engine works, joined to a good technical could (Mr. Higgins thinks) be made to pay a very large ion, if not all the shop expenses. In such a school the ould spend half the day in school and the other half in p. They would pay little or no tuition, but they would nothing for their work. The school would be divided o sections, and these would alternate in school and shop A sufficient number of expert machinists would be regu- mployed to oversee the shop work of the boys and to the shop instruction, while the theoretical or school work be given to both forenoon and afternoon sections by set of technical instructors. In this way very nearly shop conditions could be introduced and the advantages old apprenticeship system would be retained in addition urther benefit of a regular school training."

are all inclined to favor "the bridge that carried us over." gins is a "practical" man, familiar with apprentices and ive machine shops; he grew up in their atmosphere. n the Worcester Polytechnic shops he maintained the com- feature of actual production. He has very little faith in ctical value of educational manual training. As schools training of future mechanics he regards manual training as failures. He notes that their students and those from chanical colleges established by national appropriations largely developed into civil, mechanical, and electrical ers," and hence the institutions "have not fulfilled the of the founders."

Higgins has written at large on these matters, and his and suggestions are entitled to careful consideration. points present themselves, which I shall consider in order:

1. When and how shall a boy make a wise choice of an occupation?
2. To what extent does "manual training" as gained in schools and academies open the doors into the trades?
3. Why are so few "manual graduates" enrolled as mechanics? Does the small number indicate any failure or disappointment?

1. The choice of an occupation is a very important matter. The theory of the ordinary manual training school assumes that the boy of fourteen or fifteen is unprepared to make a choice, first, because he does not know himself, his mental and physical possibilities; again, because he does not know what the different trades involve; finally, he does not know what other avenues of employment or occupation there are which would naturally compete in his mind with the mechanical trades.

On the other hand, Mr. Higgins assumes that the boy who, just leaving the grammar school, makes, or can make with the assistance of his parents and friends, a deliberate choice of an occupation, and that he can enter upon the pursuit of it with confidence.

Years ago, way back in the 70's, a Mr. Ruggles, of Boston, proposed to organize what he called a Developing School for the youth of Boston. This was to be a school with certain academic features as its central point, and around it a series of practical commercial shops, each one of which involved the principles and practice of some trade. The exact number of the shops was of course not defined, but the number was supposed to be large enough to cover all reasonable demands from the community. Mr. Ruggle's plan was this: To admit a fourteen-year-old boy to this school, and during his first year have him spend a few weeks in each one of the shops in order that he might sample the work, as it were, and find out which one was to his taste. At the end of a year he was to make a deliberate and final choice and spend the rest of his shop time while in school in gaining thorough mastery of all the details of the trade he had chosen.

This plan was fully explained in a very interesting pamphlet supported by a large number of opinions from eminent men as to the necessity of some sort of opportunity for a boy to acquire a knowledge of the mechanic arts. It is hardly necessary to say that this plan came to nothing. In the first place the enormous extent and cost of such an establishment, which should provide

the variety of occupations of a modern city, put the matter to all question.

1885 I visited the Trade School on the Boulevard de la Chapelle, in Paris. There I found in miniature, Mr. Ruggle's idea realized. The boys entered at thirteen or fourteen; one year was spent in sampling the shops, and two in learning a trade. To be sure the number of practical shops was not more than four or five, and those shops were not so much intended to teach trades, as the term is used in this country, as they were intended to teach the actual construction of certain lines of goods. For instance, one of the shops was a place where the boys learned to make drawers for doors, drawers and safes. Of course there was quite a quantity of locks manufactured, but every boy in that shop did not make locks, and the drafting he learned (which was the minimum) concerned itself almost wholly with the detailed drawings of the parts of a lock. Another shop was very much like a machine shop doing a small range of work, but with a very thorough course of instruction and training in the work they did; there was a forging shop, where each boy who selected that department became a practical blacksmith. The woodworking was not so much for general culture as it was for learning the manufacture of certain articles of household or office furniture.

Noticed, by the way, that the boys were fairly distributed through all these shops. This by no means indicated, as I thought, that the natural bent and fancy of the boys had led to the result, but that under the advice of the management this had been brought about in a perfectly natural and business way, with a minimum of judgment on the part of a boy and a maximum of shrewd advice on the part of the director. I remember asking the director what he did with a boy who found that he was not well suited to any of the trades which they tried, and finally discovered or thought he discovered, that he went out for something else and not for a locksmith, or a blacksmith, or a machinist. He turned upon me with a very confident air and said with some little feeling, "These boys are to learn a trade, and they do learn a trade, and the moment they leave this school they go to work at the trade. There are no exceptions to this rule. Every boy must earn his own living, and there is no other course for him to pursue."

As to the academic work done in that school, it was of a very poor and inadequate sort. It was evident that the moment a

boy had made his choice, his academic work was trimmed down to just what were supposed to be the "essentials" for the track which he had chosen. In fact it seemed as if all other doors were shut the moment he entered a shop the second year and his destiny was sealed.

I came back to St. Louis entirely satisfied with the plan of the school, in so far as it left the student free to make his choice of occupation at a later period when all the presumptions would be in favor of a correct choice. Our prospectus states among the objects for which the St. Louis Manual Training School is organized, this: "The school is to serve as a developing school where pupils can discover their inborn capacities and aptitudes whether in the direction of literature, science, engineering, or the practical arts."

In point of fact I suppose it to be true that so far as a majority of our patrons go, the controlling motive in sending boys to the Manual Training School is to find out what is in them, what their innate capacities and inherited tastes really are. Parents here come to me continually complaining that their boys will not decide what they want to do in life. Again and again, having heard boys in the presence of their parents insist that they do know what they would like to do; that they cannot make up their minds. This sort of answer very frequently irritates the parent, and it has been my privilege to read the parents a very pointed lecture, on the spur of the moment, showing them how utterly unreasonable and illogical they are; and I have commended the boy for persisting in his attitude of unwillingness to decide whether he wishes to be an electrical engineer, or a chemist, or an architect, or lawyer, for the simple reason that he is utterly unprepared to make such a decision.

To be sure I know parents are delighted often to find that their boy has a decided preference for a certain occupation. I know a little fellow of thirteen or fourteen years of age who for several years has insisted upon it that he is going to be a lawyer, and his parents have been perfectly delighted with his choice and are doing their very best to steer him into the legal profession, overlooking everything in his education which does not seem to be necessary to a lawyer. Of course I think the parents are very foolish, and possibly they may regret it. There is one chance in a hundred that his intellectual characteristics fit him for the law, but that no matter how thoroughly all his brain areas are developed he will find his natural bias for the legal profession; but chance

decidedly against it. The whims and fancies of a boy are as variable and as natural as is his appetite for play and his passion for sweetmeats, but they depend very largely upon his environment, upon what he sees and hears, and the opportunities seem to be open to his boyish gaze. However, they are all mere indications, and have very little to do with natural or inherited aptitudes.

I wish you would take William and give him a thorough course of training in this school. I wish to find out if he has any mechanical aptitudes. He has never shown any and I am doubtful if he has any, but I wish to find out for certain." That is what a father said to me one day as he brought his little son of fifteen years to my office in the Manual Training School. I did not ask William what he wanted to be, but I put him at work on the regular course of study and training in the school. He took the science, all the mathematics, the Latin and English, the drawing and the tool work, from joinery in the first part of the year to machine shop practice during his third year. He grew out a good scholar, a good draftsman, an expert and efficient workman in whatever he undertook. He went on through the school of engineering and he is now a very successful manager of a large mining establishment, having supervision over all departments, whether financial, mechanical, or metallurgical. I need only add that the development was very satisfactory to the father, and withal was much of a surprise to both father and son.

In regard to this matter of boyish fancies I find myself exactly in agreement with Professor C. Hanford Henderson, who was formerly Principal of the North East Manual Training High School in Philadelphia, but who recently resigned to devote himself to philosophical subjects along the lines of literature and pedagogy. Professor Henderson protests vigorously against all attempts to rob a boy of fourteen of his freedom of choice. He says: "At fourteen a boy is too young to interrupt the culture process, much too young to know what will be the true occupation of his adult life. I have seen—and who indeed has not?—the very sad effects of this too early specialization. A boy of fourteen is full of fancy and it is perfectly right and wholesome that he should be. No harm comes when those fancies are taken too seriously. They do not then occupy his leisure time. Let him run the whole scale of boyish interests, let him be the naturalist, surveyor, mechanic, electrician, astronomer, artist, musician, poet, philosopher. Let

him go in for them heart and soul, and then, quite as lightly, let him drop them. You make a sad mess of it when you hold a boy to an outgrown interest."

This testimony of Professor Henderson recalls what I myself said in a paper which I presented to the Society for the Promotion of Engineering Education in 1897: "The fancy of a boy regarding his future occupation, may, and probably will, change with every year of school training; but that should excite neither rebuke nor criticism. The boy that starts with the hope of becoming an electrician and comes out with an ambition to be a lawyer is not to be called fickle; and he that begins with the firm purpose of being a machinist, but graduates with the deliberate aim of being an architect, has probably replaced a groundless whim with an intelligent choice. Give a boy manual training, by all means, not because you wish or hope that he may become an artisan, but because you want him to be a whole man and to have an opportunity to make the most of himself, whether he become in the end an artisan or an artist, a follower or a leader, a bookkeeper or a general manager, an engine driver or an engineer, a farmer or a manufacturer."

Now, as I understand Mr. Higgin's proposition, it is to organize his half-time school out of pupils who have already decided to become machinists. They are of course young boys, but they have made the decision and Mr. Higgins would hold them to it through thick and through thin. He considers the machinist's trade as the one trade for young Americans to learn, and apparently he would ignore in his arrangement all other trades. Undoubtedly there is need every year of a certain number of new machinists in every community, numbers which we are not getting at present, unless they are imported; but I do not think any community would sustain for any great length of time a school of any magnitude all of whose graduates were journeyman machinists. It would soon be seen that there was a lack of balance in the system. The school would certainly arouse, if not a bitter feeling of opposition, at any rate a feeling that it was exceedingly unwise to foster a single trade and neglect all others. Such a scheme might work very well in an European community where the boy inherits his trade about as surely as he inherits his name. In such a community there is no question as to what a boy is to learn to do, and what he is to continue to do when he learns; but in this country it is absolutely contrary to the whole genius of our institutions to shut a boy out by a one-sided, narrow,

perfect education from any honorable occupation. I have sometimes used the figure of open windows and open doors. I said that the manual training school has many windows through which all of the great professional and industrial arts may shine in upon the students, and where the student may look out upon all the activities of modern American life; and the school has many doors through one of which the graduate may look out into the field of his final and deliberate choice.

A trade school may be a great success in a large city like New York, with a constituency that comes a thousand miles for its graduates, along various lines, because it cannot more than satisfy legitimate demand; but in a city like St. Louis the school must be one of generous and broad culture, and the graduates must leave its doors with no other restraint than that which they find in themselves and in the opportunities which present themselves through their families and friends.

Here is the way in which Mr. Higgins calls upon a fourteen-year-old boy to make a choice, and his parents accept his judgment. "John is fourteen years old; he has completed the grammar-school. If he enters the high school, it means four years more." This is often a very important question. The mother says that, if John goes to work with a doubtful chance of learning any trade, he practically shuts the door against future liberal education and culture. The father is earnest and willing to sacrifice heroically, so that John can go on for four years in high school, although he does not know what the four years in school will do for him; and so, in his perplexity he says, "Well, John, we can get on, I think, for four years in the high school. You will then be a strong man of eighteen. What will you do then? It must be admitted that the answer to this question is not a simple one, although it is a very important one. Now imagine that John is able to say, 'Father, the problem is solved. The 'half-time' school is now open. In it, I will become a skillful machinist, able to earn more than a living immediately upon graduation, and I will also have all the benefits of a high school education at the same time.

My intense sympathy for "John" makes this picture almost pathetic. If the "high school" referred to by the father is a manual training high school, I think John makes a mistake, which will effectually block his future progress. Mr. Higgins says that every boy "should find his career entirely open at the top," and that, as it seems to me, he closes the elevator door and locks it.

Of course John's mother is right in thinking that if John's school altogether all hope of "future liberal education and culture" is gone. The "half-time" school is better than no school; there is no question on that point. Neither am I comparing the half-time plan with the ordinary literary high school; I find myself unable to thoroughly endorse either for the general use of the community. I am comparing the half-time trade school with the typical manual training school.

The records show that the latter school does leave a better career open at the top, but I am confident that a boy who spends half of working man's day in a shop would find it quite contrary to nature to do a full school day's work during the other half. A healthy boy must have hours for private study, open-air exercise and play. If due allowance were made for John's health and pleasure, he would learn his trade, but he would find his progress in mathematics, science, language and drafting very slow. The odds are many to one that he would settle down to his trade and abandon his ambition for a career.

Instead of sending John to a half-time school with a commercial shop, suppose you let me send him at fourteen to a manual training school. He now has his three recitations daily, (mathematics, language, science,) his period of drawing, and his period of tool-work. There remain over three hours of the day and his evening for study, recreation and play.

With this program, he will easily prepare for the engineering school at eighteen, as hundreds and thousands of boys have already done; and the chance of his completing the preparation are ten times as great as they would be under the half-time plan.

2. Mr. Higgins attaches great importance to John's ability to earn full journeyman's wages at the end of his four years of apprenticeship. John can at once begin to save money, and his saving constitutes his main reliance for a higher education. On the other hand Mr. Higgins seems to think the boy who has received mere manual training is incapable of earning a living, much less of saving. This is a question of fact, and statistics and testimony are in order. Facts and figures vary greatly according to circumstances, and trustworthy information is hard to get, but I am not surprised at the wages the graduates of our three-years course are able to command. Our St. Louis experience covers a longer period than any other, but we shall be glad to hear on the matter of wages from Chicago, Philadelphia, Baltimore, Toledo, Boston,

City, Denver, Louisville, Cleveland, New York, and
e.

graduates earn from \$30.00 to \$75.00 per month by the end
r, and we are not able to graduate boys fast enough to
al demand. They are wanted for draftsmen, electrical
inspectors, apprentices and clerks. Their versatility
them valuable as assistants to superintendents and general

Letters of application usually say "We have had one
) of your graduates and we would like one (or more) of
sort."

not sought information in regard to wages of late years,
reason that in St. Louis the pecuniary value of our gradu-
well established. One third of our graduates go on into
education, either immediately or after working a year or
the following extract from a letter written by the Master
c of the Missouri Pacific shops in this city is pertinent
the letter is addressed to me and is dated, St. Louis, May

n a manual training school boy enters our shops he is
50 per day; all other boys, or those not having what is
manual training school education, are paid \$1.00 a day.
ar after the first we add 25 cents per day to the pay of
ys, and when they become proficient, or at the end of the
r, they receive very nearly the full rate; provided they
right kind of boys. Were it possible *I would in all cases*
employing graduates from manual training schools for appren-
ordinary boys who apply to us with perhaps nothing more
very ordinary public school education, but, of course it is
ys possible to act on these lines.

re have been cases where young men, graduates from
schools, have come into our shops and have actually been
ore money to us than we were paying them, but in
ce with rules established long ago in regard to appren-
could not give them higher wages.

n confidently state that most of the graduates who have
me from the Manual Training School of the Washington
y have proven to be exceptionally good boys and have
at good men. In fact, *most of them do so well that they*
offered better situations and they leave us to accept the
cause we cannot afford to pay the wages they can com-
om other sources."

It must be remembered that our boys have equal knowledge and skill with wood-working, forging, and machine tools, with drawing instruments, so that those who want work should be directed according to taste and opportunity in all directions. I maintain a regular bureau of information, where boys wanting work can apply, and where employers may send for "another graduate."

I am not discussing the feasibility of the "half-time" plan, which is a serious matter which I leave to its advocates. I am concerned just now in showing that to a boy whose parents are unable to give him more than a secondary education, and who consequently must begin to "pay his way" when he is eighteen or nineteen years old, the manual training school offers an equal, good if not a better plan than the half-time school; and that it far more effectually keeps his "career open at the top."

3. The apparent failure of the graduates of manual training schools to become and remain mechanics.

The most interesting and valuable part of the annual catalogue of the Manual Training School of this city is the Record of Alumni. This record is carefully kept, revised and republished every year. Our last issue contains a list of 818 graduates. The first class graduated in June, 1883; hence, the oldest have been out of school eighteen years. As you will see they are old enough to be recognized among the active men of affairs of the present day. The youngest are just out, but I submit that the Record is for your careful inspection.* I regret that I am not able to give you information in regard to every one of these men, but such information as I do give may be relied on as substantially correct, as it was correct when the catalogue was published.

The careers of these young men illustrate better than anything else the fruit of manual training. You will find, if you look over the list, as Dr. Wm. T. Harris once jokingly said, that there is an "alarming tendency on the part of these graduates not to become mechanics." That was a mere jest, but I suspect that at the beginning the very general expectation was that most of our boys would become mechanics, and there are not a few people to-day who have this feeling in regard to the matter. In so far as the graduates do not become mechanics, they regard the *school* as a failure, and in so far as the graduates do become mechanics, they regard the *boys* as a failure. You know that there are in the world plenty of pessimists who are never so happy when they are made unhappy by failure of some sort.

*See Catalog of 1901.

the sake of reference and comparison I here submit a
analysis and summary of the occupations of our 818
es:

OCCUPATIONS OF THE GRADUATES OF THE ST. LOUIS MANUAL
TRAINING SCHOOL.

chitects	19
tists	5
nkers and brokers	4
erks and bookkeepers	118
raftsmen	82
ngineers and chemists	82
urance and real estate	21
wyers	24
chinists	35
anufacturers and contractors	21
rchants	15
ysicians, dentists, and pharmacists	22
actical electricians	12
esidents and general managers	32
er officers of companies	53
esmen	54
ock, fruit and farming	13
udents in higher education	65
perintendents and foremen	43
achers	34
scellaneous (including 1 clergyman, 2 army officers and naval officer)	13
ad	36
known	32

al engineers with degrees are counted twice.

w years since an eastern critic predicted that the graduates
Philadelphia manual training schools would become a
led mass of operatives." At that time the schools had
duated a class, but such was his cheerful prediction. A
letter from Professor Marburg shows that out of 1,063
es of the two manual training high schools of Philadelphia
almost 30 per cent have entered college, about one-half of
have entered the University of Pennsylvania and Drexel
e as students of engineering and architecture, and that
lphia is gradually being supplied with a class of well-
technical men who started in the manual training schools.
s no question to-day as to the high standing which those
re taking in that community. As to "degraded opera-
there is not one; there are, however, skilled mechanics;

three carpenters, three plumbers, five engravers, and four machinists. So the evil prediction failed.

Again, it was expected in the beginning that in cities where both schools were free, the manual training school would be largely patronized by the working people; that the sons of mechanics would naturally seek the manual rather than the ordinary high school; but such was not the case. It was found that a majority of the boys came from the homes of merchants, manufacturers, and professional people. It is unfortunately true that a mechanic who spent from four to seven years learning a trade is well imbued with the notion that his way is the only way in which a boy may become a mechanic, and consequently has no faith in a school which devotes only from eight to ten hours a week to tool practice, and where the fundamental processes of the forge are learned in thirty weeks, and where machine tool practice covers only about thirty-eight weeks, with less than ten hours a week. Every mechanic is incredulous when told that a graduate of the school who happens to be at work in a shop has got all he knows about tool-work in the manual training school. To the mind of an ordinary mechanic the proficiency shown is altogether out of proportion to the time spent there; there must be some other explanation.

This feeling on the part of mechanics explains in part why so few sons of working people entered the school at first; and it in turn partly explains why so few became mechanics when the course of the school was finished. However, a better understanding of the practical value of manual training is gradually removing the prejudice. Last September I asked a boy what led his father to send him to my school (which by the way is not a manual school, as are manual training high schools.) He replied that his father was a machinist, and that he had noticed that the graduate of the school working in his shop got more paid and was advanced more rapidly than other boys of the same age. The boy's skill was evidence enough that the manual training school was worth while. So he resolved that his boy should have the benefit of it.

A second reason for the small number of mechanics among the graduates has already been hinted at in the observed tendency of laboring people to shun the school from a vague suspicion that the school was intended to teach manual labor to keep boys at manual labor, no matter how much a hard-working father might wish his boy to have an easier or a more ge-

than he had had himself. This reason was potent. The school was new and its educational value was in doubt. It is very strong now, and it grows weaker every year.

The third reason is the chief one and it removes all doubt and answers all queries. A fair and reasonable proportion of our manual graduates do turn to industrial establishments for employment in some capacity. They find a great deal of work on the ordinary line, which pays fair wages and has more promise for the future than regular apprenticeship. Again the number who have actually taken terms of apprenticeship is much less than the number of those now rated as "mechanics," for many of them on that they have accepted higher positions and better wages. Nearly all those who are reported as general foremen and superintendents took more or less apprenticeship before entering their present positions.

Even though the number of manual graduates is small, just so long as the boys win promotion. Were the number of manual graduates turned out each year twenty times as great as it is, the number who would become and remain mechanics would be fifty times as great as it is. In other words by multiplying manual training schools, we shall solve the problem of training all the men our industries need, and at the same time we shall leave the way open to higher things for the rare and gifted ones. The Hercules, "will find a way or make one." *

There is a place, and a very important one, for the trade school, and it will be a long time before we outgrow the need of it. There is in every city a large army of young men, from eighteen to twenty years old, who have never received a secondary education; who have no business positions open to them; who, though they are 'hands' in different establishments, earn the wages of unskilled workers, but who would gladly learn trades. They are, however, too old for the full course of study in the manual training school. For them the 'half-time trade school' may be a necessity, and in meeting that necessity the school will find sufficient justification." As for the 14-year-old boy, let him enter the manual training school.

Let me, in closing, to say a word as to the danger of too much education. Ever since Alexander Pope proclaimed that "the learning is a dangerous thing," people have insisted that certain very necessary occupations are incompatible with education, and that we must be careful not to educate too much.

veniā viam aut faciam."

Well, suppose your educated boy does step to a plane that is intellectually and socially higher, is there any cause for regret? Should there be a sense of failure? Suppose the boy is your son or brother, do you still regret? Or do you regret such only when the boy is the son or brother of an uneducated laborer? In my judgment, no one can ever be hurt by thorough well-balanced education and training. Plenty of people suffer from ignorance and lack of education. If education ever makes a man foolish and helpless, it is because his education has been unbalanced; because he has been fed on prejudices, traditions, and conventionalities; not because he has learned how to apply his knowledge to the problems and duties of real life. If you make a boy believe and feel that it is not genteel to take a skill in his hand, he will not become a farmer or a mechanic. On the other hand, you teach him that the skilled hand is an honorable and a fit companion to the cultured mind, he will cheerfully become an artisan, and he will remain one just as long as the world will let him. The world will load him with responsibilities according to its needs and his ability, and if, in the end, he becomes a superintendent or a general manager, it will be because he is in demand as such. The only people that will hinder his path and depreciate his abilities are those ill-taught intellectuals who try to believe that unskilled hands and an ignorance of practical arts are the best evidence of refinement and culture.

CALVIN MILTON WOODWARD

Washington University, St. Louis, May 23, 1901.

ICARIAN COLONY.

It was thought desirable to give a larger space to the economic phase of this colony, but it was found that the records were meager, especially as five years had intervened between its publication and the present time. The colony site was visited personally, and the statements which follow this introductory survey were verified through the kindness of E. F. Bettanier, the sole survivor, and to whom the Bureau is indebted for numerous courtesies.

ICARIAN COLONY.

BY ADAMS COUNTY UNION-REPUBLICAN, DEC. 22, 1898.

Few sociological experiments have attracted more attention

olars and writers than the Icarian community at Corning, county, Iowa.

singular to say, the people of the county nor the state ot much interested.

898 the district court appointed a receiver to wind up the of this community, which had existed for a generation, w it is one of the things of the past.

y years since, Ettienne Cabet stirred France with his doc-

The government was very unfriendly to such ideas, but eless he succeeded in starting a movement that became national in its scope, but was finally forced to leave and come to America to perfect practically his plans.

representatives first located in Texas, then came farther purchased the old Mormon site in Nauvoo in Illinois, 15, 1849, and here 2,000 of the Cabet people settled, own- everything in common, but submitted to the most rigorous ism by Cabet; they evidently prospered for a time, but dissensions arose and the colony divided, Cabet and his rs withdrew and located near St. Louis and maintained d system, but their experiment soon came to an end.

rious to this division the Nauvoo colony had become con- that it would be advisable to move farther west and so- way from the influences of individualistic civilization, and they purchased 4,000 acres in Adams county, near Corn- Iowa, and to this spot the other division of the Nauvoo removed. The first case on the court docket of Adams is their record.

community grew and prospered for a time, but at last met ome financial reverses and a mortgage on the land was o William Shepherd of St. Louis, who later, 1859, deeded o the community clear 2,000 acres of the land; prior to owever, a proposition had been made to move still farther nd California was advocated, but met with defeat in the ouncil by the majority of only one vote.

er this a period of great prosperity was enjoyed and the colony seemed destined to achieve great success; but the nding country being rapidly settled, the newcomers t with them their individual ideas of private property gs, and this influence had quite an effect on the rising generation of Icarians, and who began to withdraw in rs to enjoy a larger measure of individual freedom in all ss matters.

This continual and constant drain of the young blood was a severe strain; it has been generally acknowledged that they were people of the greatest intelligence, of industry and thoroughly acquainted with agricultural arts, and who introduced good culture into Iowa, following the French method, and the beautiful vineyards in this section of Iowa stand as a memorial to the Icarian colony.

The golden rule was the fundamental principle of Etienne Cabet's theory, and he aimed to practically apply the teaching of Jesus to the everyday transactions of business. Everything was owned in common and the productions of the community were held by the community for common and general use; they ate from one table like the Spartans of old.

But the influence of the surroundings was too strong for the altruistic spirit prevailing for elimination at one single bound in one generation, and in 1886 a division of the community was agreed to, and after this there was the New Icaria and the old Icaria. In a year or so the old community disbanded and divided its property among the members.

The new community continued for a number of years, flourishing hopefully at times, but in the end the same disintegrating influences affected it as they had done before, and finally, on June 16, 1895, Mr. E. F. Bettanier was named by the district court as receiver on application of the disputants, and in the course of three or four years he closed up its affairs, and in October, 1899, he was discharged by the court, having shown that he had fully discharged his great trust and made proper disposal of the property of the community.

ADAMS COUNTY FREE PRESS.

Cabet died in 1855 at St. Louis. Icaria was incorporated under the laws of Iowa in 1876. The liabilities were \$4,000 and the assets \$60,000. In 1879 there were eighty-five persons, and this was the time of the second division, some going to California. Since 1879 Mr. E. F. Bettanier has been the president.

At one time an organ was published by them called *La République Icarienne*, and many industries flourished. The following is a selection of the excerpts from their constitution:

It is established in the interest of entire humanity, in devotion to its well being, in order to present to it a system of socialism capable of rendering it happy and to prove by experience that communism based upon complete solidarity is realizable and possible.

common fund supplied the wants of all and a common
y received the earnings and savings of all.

cutive power was vested in a committee of three trustees,
d from a general assembly composed of all members over
one years of age, without respect to sex.

mission was gained by an applicant putting all his posses-
into the common fund and conforming to the constitution.

ndrawals were possible by giving one month's notice. The
ly took into consideration the services that he or she had
ed and bestowed upon them two-thirds of the amount

ly invested and a reasonable amount for services while a
r.

greatest freedom was tolerated in regard to religious ten-
ember held so long as they subscribed to the golden rule.

\$36,000 in cash and 1,000 acres of land were divided
n the members.

et was a contemporary and co-worker with Proudhon, the
rench essayist, agitator and historian, and together they
uted much towards stirring France in behalf of the poor
ressed in that land during the exciting days of 1848.

reputed that there was at that time over 400,000 Icar-
Cabet held that the practicability of his theory was only

e after long years of study and preparation, but, chal-
on all sides to prove the practicability of his theory, he

d to silence his adversaries by the establishmet of a vast
mental colony, and on February 3, 1848, sailed from Havre

as, where a large grant of land had been secured. Nine-
ollowed on the 3d of the following June, but becoming dis-

ed with hard pioneer work, and unaccustomed to the
heat and afflicted with malaria, they were on the point of

ng from New Orleans, when Cabet landed with 400 more.
then decided to go on to the deserted Mormon Nauvoo,

g there on March 15, 1849.

et lacked the ability to direct, although a profound phil-
r.

y manufactured some wine every year, although they were
ly temperate people and never drank to excess, were well

ed in French and English, and possessed the politeness of
ice.

FREE EMPLOYMENT OFFICES.

The following review of the free employment offices shows some very interesting comparisons:

Ohio: *Estimated* amount which would have been paid by agencies by applicants during annual period, \$20,132; deduction of maintenance of "free office," \$5,000. A net saving to the Ohio people of the state \$15,132.

The above estimate is based on the fee of \$1 and is believed to be below the real cost. In this connection it is proper to note that the state of Washington reports an average cost of position secured by the state employment office at Seattle: 1892, 22, 93 cents; 1895, 19, 38 cents; 1896, 21, 38 cents; 1897, 22, 93 cents; 1898, 5, 64 cents; 1899, 4, 98 cents.

One particular divergence between Ohio and Illinois is noticed: Ohio compels the cities themselves who by the operation of the law have free employment bureaus to pay for their maintenance, whereas in Illinois their maintenance is paid for by the state and there the service is materially helped and its efficiency increased by the co-operation of the factory inspectors, which may be made doubly useful by obtaining and furnishing information both as to help and employment wanted, a plan that could be advantageously adopted in our state.

Free employment bureaus, as conducted in many of our states, are not an experiment any longer, for they have proved their right to exist at the State's expense, and I believe I voice the opinion of not only the labor organizations but the general opinion of the wage-earners of the state, in advocating the establishment of free employment offices under the supervision of the labor commissioner, either on the Ohio or the Illinois plan.

This beneficent arrangement would prevent congestion of laborers in certain localities and do away with the scarcity of others. Farmers could in time of pressing work, such as harvest time, have access to this clearing house and idle men easily find employment.

The reasons for the establishment of free employment bureaus

vious that as the urban population (which is now 43 per cent of the whole) increases their establishment will become an absolute necessity.

A free employment office is a product of Europe, France being the first nation to put the plan into operation. From Paris the movement spread all over Europe, extending into Germany, Austria, Russia and Bavaria, and reaching New Zealand and Australia.

The plan was brought to America by an official of Ohio, who, after an investigation of the Paris office, recommended the establishment of a free employment office in Ohio. By act of the general assembly, passed April 28, 1890, a law was enacted whereby offices were established in the five largest cities in the state, viz., Cincinnati, Cleveland, Columbus, Dayton and Toledo. I appended a copy of the Ohio law (pages 16 and 17). It is unnecessary for the purposes of this paper to go into the details of the annual reports of these various offices. I desire to give a historical statement of the movement in this country rather than an argument for or against it. Some figures, however, are necessary and interesting to show the scope and growth of the work.

The report of the Ohio bureau of labor statistics for the year 1890 shows the work of the different offices since their establishment. The first office was opened in Toledo, June 26, 1890, the office at Columbus on September 2d. The report for 1890 includes the work of these offices from June 26th to October 1st. During this report period there were 20,136 applications for positions, 10,988 applications for help, and 8,988 situations were secured for applicants. It is in the relation of these figures to each other that we find the most significance. The number of situations secured was 44.6 per cent. of the situations wanted, and 49.5 per cent. of the help wanted; the help wanted was 90.2 per cent. of the situations wanted. These figures show that employers and applicants were ready to seize the opportunities held out to them by the state and to free themselves from the exorbitant and often unjust charges of many of the private agencies.

Another interesting statement in this fourteenth annual report of the bureau is as follows:

Estimated amount which would have been paid to agencies for applicants during this period.....	\$20,132.00
Actual cost of maintenance of offices.....	5,000.00
There is shown a net saving of	15,132.00
for the working people of the state.	

Of course the first figure of \$20,132 is an estimated one. The investigations made by different labor commissioners and private agencies in their respective states show that a fee of \$20 is not a high average for applicants to pay for registry for employment. In addition to this registry fee, the private employment agency demands a per cent. of the first wages.

A test year of such work as the free employment office has to do was 1893, a year of great business depression. In that year the figures are as follows:

Total number of situations wanted.....	20,132
Total number of help wanted.....	15,132
Total number of situations secured	15,132

The help wanted was 69.15 per cent. of the situations wanted. Positions secured were 76.62 per cent. of help wanted, and positions secured were 49.16 per cent. of the situations wanted.

This would seem to indicate great activity on the part of the offices and hearty support and appreciation by the employers. In 1891 43.2 per cent of those applying for positions secured them. The figures of 1893 show an increase over these, but there is a slight decrease in the 1893 figures when compared with the year 1892. In that year 51.36 per cent of applicants for positions received them. The World's Fair is held by many to be the cause of this decrease.

The latest obtainable report of this bureau, that of 1900, shows the following figures:

Number of situations wanted.....	20,132
Number of help wanted.....	20,132
Number of situations secured	15,132

Help wanted was 93 per cent of situations wanted. Positions secured were 59 per cent of help wanted, and positions secured were 64 per cent of situations wanted.

Thus it is seen that the "Ohio experiment" as it has been called, has demonstrated the advantages to that state of the public administration of a free labor employment office and the use of her unemployed workmen.

The first state to follow the example of Ohio was Washington, an office being established in the city of Seattle in 1894. In that year 2,823 applicants secured positions through the office. In 1897, 8,736; in 1898, 21,948; in 1899 there was a slight decrease, the number being 20,070. In Washington the office places large numbers of hop-pickers, but their season is so short, and

so uncertain, a fact due to the variability of the crop, class of workmen is not included in the figures given.

Washington report there is also the interesting financial statement showing the cost to the state of each position secured. It follows:

1894	22, 93 cents.
1895	19, 38 cents.
1896	21, 38 cents.
1897	6, 24 cents.
1898	5, 64 cents.
1899	4, 98 cents.

Commissioner for Washington says he has made special study to be of service to the skilled workmen, and he has been aided by the marked increase in skilled help he has supplied. He does not, however, give figures classifying the workmen according to their trades.

He has also made investigations as to the satisfaction given to employers by the help furnished through his office as compared with that furnished by the private agencies. The employers' help furnished by the free employment office has been more satisfactory than that furnished by the pay agencies.

The work of the Seattle office is contained in the report of the Commissioner of Labor for Washington yet the conduct of the office is under the control of the city, and is maintained

In 1895 to 1897 the Commissioner of Labor of California established a free employment office without any special appropriation from the legislature, the funds being supplied by private subscription. At the end of that time the office was discontinued, providing for such work failing to pass. In the Ninth Annual Report of the Bureau of Labor Statistics of California, 1900, the commissioner after a review of the results of the experiment in 1895-1897, and a statement of the advantages and disadvantages of state control, concludes his report on the subject by recommending, not the establishment of a state office, but a supervision of private ones and the enactment of certain regulations regarding fees, etc. He says further that not more than one per cent of the wage earners of the state are patrons of the free employment agencies.

In the same year that the Commissioner of California was conducting his experiment, Montana established a free employment office. The law in Montana at first provided for the establish-

Applicants for positions	6
Applicants for help.....	1
Positions secured.....	1

Twenty-seven per cent. of those applying for work received as against 24 per cent. in the previous report.

In looking at these figures and comparing them with those of other states, the location of the office, and the fact that no appropriation is made for it must be borne in mind.

In Missouri the State Bureau of Labor opened a free employment department in St. Louis the first Monday in October, 1897. No appropriation was made for this office by the state, all expenses being paid out of the regular appropriation for the Bureau of Labor.

In the annual report for 1897 there is a statement of the results for the first month.

Applicants for positions.....	1,511
Applications for help.....	237
Positions secured.....	521

The number of male applicants far exceeded the female applicants, the former being 1,511, the latter but 237. The female help desired was about 50 per cent. of the male help, the figures being 521 against 261.

In 1898 the St. Louis office shows:

Applicants for employment	4,122
Applicants for help.....	3,122
Situations secured.....	2,312

Nearly fifty per cent. of those applying received work.

In but four classes of labor was the demand greater than the supply, viz: factory workers, housework, miners, salespeople and solicitors. There were 1,271 applicants for positions as office workers while there were but 156 applications for such help. Boys seemed to be in demand, 140 of the 152 applicants receiving positions were the unskilled labor, the ordinary day laborer and the teamster who applied in large numbers, and whose labor was not in demand, but about three per cent. of the applicants of this class received work.

In December, 1899, an office was established in Kansas. The work of this office, from its opening to October 1, 1900, was much larger than that of the St. Louis office. The total results for the two offices are as follows:

Applicants for positions, St. Louis	4,222
---	-------

applicants for positions, Kansas City.....	7,311—11,533
applicants for help, St. Louis.....	2,281
applicants for help, Kansas City	5,243— 7,524
positions secured, St. Louis	1,928
positions secured, Kansas City	4,278— 6,186

will be seen from these figures that there was a decrease in work of the St. Louis office. There is nothing to show whether any of the applications were diverted from the St. Louis office to Kansas City.

this year over fifty per cent. of the applicants received positions, the gain being about one per cent. over the previous year. The Missouri law provides for the establishment of the Free Public Employment Office in all cities of 100,000 inhabitants. The commissioner in his last report recommends appropriations for the establishment of an office in St. Joseph.

Next to New York the state in which there would seem to be the largest demand for the Free Employment Office is Illinois, the second city in the United States being in that state. But it is not until 1899 that the legislature of Illinois passes a law establishing the free employment office. A copy of this law is attached, pages 18-24. A comparison of the Ohio law of 1890 and the Illinois law of 1899 will show progress of the feeling towards the "free experiment." It is no longer an experiment, and the state, instead of shifting the burden of the maintenance of the offices to the cities in which they are located, provides for them out of state funds. Enlisting the services of the different inspectors of the state to aid in the placing of labor is an advantageous feature of this law. Illinois seems to have done all in her power to bring the demand for labor and the labor supply together. The results may be seen from the reports. These reports give the statistics of the offices in much greater detail than do the reports of other states, and since in no city can labor conditions be improved with greater advantage than in Chicago I will give in some detail the work of the Chicago offices.

Under the law three offices were established in Chicago in 1900, one on the West Side, one on the North, and one on the South Side. The report for 1900 gives the statistics for that year as follows:

applicants for employment.....	37,285
applications for help.....	39,866
positions secured	35,542

77.3 per cent. of those applying received positions. Unskilled

workmen form the larger class of applicants. There were sixty-one professional men and women applying and but six secured positions. One minister applied and he was placed in a institution where he performed the duties of chaplain.

The statistics for the male department are as follows:

Manual labor includes three classes of workmen, according to the report, and the statistics are as follows:

Applicants for employment.....	5,75
Applicants for help	7,32
Positions secured.....	5,60

Trades, represented by eighty-two classes:

Applicants for positions.....	2,97
Applicants for help.....	1,26
Positions secured	1,04

Agriculture represents five classes:

Applicants for employment.....	96
Applicants for help.....	1,00
Positions secured.....	91

Farm hands:

Applications for positions.....	68
Applicants for help.....	75
Positions secured	67

Clerical, represented by seven classes:

Applicants for positions.....	32
Applicants for help.....	4
Positions secured	30

Commercial, represented by twenty-two classes:

Applicants for employment.....	1,92
Applicants for help.....	80
Positions secured.....	50

Domestic service, represented by twelve classes:

Applicants for employment.....	4,19
Applicants for help.....	3,33
Positions secured.....	3,19

Transportation, represented by seventeen classes:

Applications for employment.....	2,23
Applications for help.....	1,57
Positions secured	1,43

Miscellaneous, represented by twenty-eight classes, such as apprentices, bartenders, boys (bell, errand, etc.), factory hands, janitors, watchman, etc.

Applicants for employment	2,721
Applicants for help	1,370
Positions secured	1,277
Unclassified	1,287

The statistics for the female department are as follows:

Unclassified	999
--------------------	-----

Clerical, represented by five classes:

Applicants for employment	188
Applicants for help	62
Positions secured	59

Commercial, represented by nine classes:

Applicants for employment	282
Applicants for help	137
Positions secured	106

Domestic service, represented by eighteen classes:

Applicants for employment	14,388
Applicants for help	17,321
Positions secured	13,983

Personal service, represented by three classes:

Applicants for employment	25
Applicants for help	1
Positions secured	1

Professional, represented by five classes:

Applications for employment	144
Applications for help	210
Positions secured	116

Miscellaneous, represented by seven classes:

Applicants for employment	389
Applicants for help	725
Positions secured	346

In the statistics for the male department the best showing is made in manual labor, 39.95 per cent of those applying receiving work; in the statistics for female department the domestic service is the best showing, 93.87 of those applying receiving work.

During the existence of the bureau, from its establishment August 2, 1899, to December 8, 1900, a period of seventy-one weeks, the statistics in general are as follows:

	Men.	Women.	Total.
Applicants for employment	34,491	22,454	56,945
Applicants for help			—61,622
Positions secured	22,283	21,833	44,116

Seventy-seven per cent of those applying for employment received it.

In July of the present year an office was opened in Peoria. The work of that office from July 1st to September 14th is as follows:

Applications for employment	1,503
Applications for help	1,454
Positions secured.....	993

Connecticut established a free employment office in five of her cities this summer, but there is no available report of the work. An appropriation of \$23,100 was made for their maintenance.

Many commissioners are recommending to their legislatures the establishment of the free employment offices, feeling convinced after an examination of the working of the private agencies that the state should come to the help of its unemployed in this way.

The feeling of the labor organizations toward the movement may be seen to some extent in a resolution which was read at the meeting of the Federation of Labor held at Louisville in December, 1900, from the Hotel and Restaurant Employes' International Alliance and Bartenders' International League of America condemning the private employment agencies and recommending that steps be taken to suppress them.

A communication from J. K. Vicha, superintendent of the Cleveland, Ohio, Free Public Employment office, was also read. This letter rehearses the evils of the private pay agency and also the work done by the free offices in Ohio. He recommends that the Federation use all its influence toward the establishment of such agencies in other states.

Both these communications were referred to the committee on resolutions, which reported in favor of the free employment offices, and recommended their establishment, and the suppression of the private agencies.

It is impossible, of course, to tell how many of the unemployed who seek the aid of the free employment office would go to the pay agency if the former were not in existence. Undoubtedly a large number would not do so, for there are many who do not have the fee demanded, and these are the very ones whom the state should help. When the conditions become such that the free employment office is no longer needed, as the commissioner of California says is the

case in his state, then they may easily be discontinued, but in many states there is a large class of unemployed, and the most self respecting way in which the state can care for them is to procure employment for them.

AN ACT to amend Section 308 of the revised Statutes of Ohio.

SECTION 1. Be it enacted by the General Assembly of the State of Ohio, that section 308 of the revised statutes, be so amended as to read as follows:

SEC. 308. The commissioner shall have an office in the state house, which shall be a bureau of statistics of labor, and he shall collect, arrange and systematize all statistics relating to the various branches of labor in the state, and especially those relating to the commercial, industrial, social, educational and sanitary conditions of the laboring classes. Said commissioner is hereby authorized and directed, immediately after the passage of this act, to organize and establish in all cities of the first class, and cities of the first and second grade of the second class in the State of Ohio, a free public employment office, and shall appoint one superintendent for each of said offices to discharge the duties hereinafter set forth. Said superintendents shall cause to be posted in front of their said offices on a sign board, or in a suitable place on the building where such offices are located, the words, "Free public employment office." It shall be the duty of all such superintendents to receive all applications for labor of those desiring employment and those desiring to employ labor, and record their names in a book kept for that purpose, designating opposite the name of each applicant the character of employment, or labor desired, and the address of such applicant. Each of said superintendents shall be provided with such clerical assistance as in the judgment of the commissioner may appear necessary for properly conducting the duties of their several offices. No compensation or fee shall, directly or indirectly, be charged to or received from any person or persons seeking employment, or any person or persons desiring to employ labor through any of said offices. Said superintendents shall make a weekly report on Thursday of each week to said commissioner of all persons desiring to employ labor, and the class thereof, and all persons applying for employment through their respective offices, and the character of employment desired by each applicant; also of all persons securing employment through their respective offices and the character thereof, received by him from the respective offices

aforesaid, and cause a true copy of such lists on Monday of each week to be mailed to the superintendent of each of said offices in the state, which said list by the superintendent shall be posted immediately on receipt thereof in a conspicuous place in his office, subject to the inspection of all persons desiring employment. Said superintendents shall perform such other duties in the collection of labor statistics as said commissioner shall determine. Any superintendent or clerk as herein provided, who directly or indirectly charges or receives any compensation from any person or persons in securing employment, or labor for any other person or persons as provided in this act, shall be deemed guilty of a misdemeanor, and be fined in any sum not exceeding five hundred dollars, and imprisoned in the county jail or workhouse not exceeding thirty days. The superintendent of each of said offices shall receive a salary, to be fixed by the council of such city, payable monthly. The clerk or clerks required in any of such offices shall receive a salary of not more than fifty dollars per month, provided the compensation of such superintendents and clerks so appointed shall be paid out of the city treasury in which such free public employment office may be located.

SEC. 2. That said original section 308 of the Revised Statutes be and the same is hereby repealed.

SEC. 3. This act shall take effect and be in force from and after its passage.

Passed April, 28, 1890.

LABOR LAWS OF THE STATE OF ILLINOIS.

FREE EMPLOYMENT AGENCIES IN CERTAIN CITIES.

An Act to create free employment offices in cities of certain designated populations, and to provide for the maintenance, management and control of the same, and to prevent private imitations of the name of the same and regulating private employment agencies.

SECTION 1. Be it enacted by the people of the State of Illinois represented in the General Assembly: That free employment offices are hereby created as follows: One in each city containing a population of not less than fifty thousand population, and three in each city containing a population of one million or over, for the purpose of receiving applications of persons seeking employment, and applications of persons seeking to employ labor. Such offices

shall be designated and known as Illinois Free Employment offices.

SEC. 2. Within sixty days after this act shall have been in force, the State Board of Commissioners of Labor shall recommend, and the Governor, with the advice and consent of the Senate, shall appoint a superintendant and assistant superintendant and a clerk for each of the offices created by section 1 of this act, and who shall devote their entire time to the duties of their respective offices. The assistant superintendent or clerk shall in each case be a woman. The tenure of such appointment shall be five years, unless sooner removed for cause. The salary of each superintendent shall be \$1,200 per annum, the salary of such assistant superintendent shall be \$900 per annum. The salary of such clerks shall be \$800 per annum, which sums, together with proper amounts for defraying the necessary costs of equipping and maintaining the respective offices, shall be paid out of any moneys in the state treasury not otherwise appropriated.

SEC. 3. The superintendent of each such free employment office shall within sixty days after appointment, open an office in such locality as shall have been agreed upon between such superintendent and the secretary of the Bureau of Labor Statistics as being most appropriate for the purpose intended; such office to be provided with a sufficient number of rooms or apartments to enable him to provide, and he shall so provide, a separate room or apartment for the use of women registering for situations or help. Upon the outside of each such office in position and manner to secure the fullest public attention, shall be placed a sign which shall read in the English language, Illinois Free Employment Office, and the same shall appear either upon the outside windows or upon signs in such other languages as the location of each such office shall render advisable. The superintendent of each such free employment office shall receive and record in books kept for the purpose names of all persons applying for employment or help, designating opposite the name and address of each applicant the character of employment or help desired. Separate registers for applicants for employment shall be kept, showing the age, sex, nativity, trade or occupation of each applicant, the cause and duration of non-employment, whether married or single, the number of dependent children, together with such other facts as may be required by the bureau of labor statistics to be used by said bureau: Provided, that no such special statistics shall be open to public inspection at any

time, and that such statistical and sociological data as the bureau of labor may require shall be held in confidence by said bureau and so published as not to reveal the identity of any one: And provided, further, that any applicant who shall decline to furnish answers to the questions contained in special registers shall thereby forfeit any rights to any employment the office may secure.

SEC. 4. Each such superintendent shall report on Thursday of each week to the State bureau of labor statistics the number of applications for positions and for help received during the preceding week; also those unfilled applications remaining on the books at the beginning of the week. Such lists shall not contain the names or addresses of any applicant, but shall show the number of situations desired and the number of persons wanted in each specified trade or occupation. It shall also show the number and character of the positions secured during the preceding week. Upon receipt of these lists, and not later than Saturday of each week, the secretary of the said bureau of labor statistics shall cause to be printed a sheet showing separately and in combination the lists received from all such free employment offices; and he shall cause a sufficient number of such sheets to be printed to enable him to mail, and he shall so mail, on Saturday of each week, two of said sheets to each superintendent of a free employment office, one to be filed by said superintendent and one to be conspicuously posted in each such office. A copy of each such sheet shall also be mailed on each Saturday by the secretary of the State bureau of labor statistics to each State inspector of factories and each State inspector of mines. And it is hereby made the duty of said factory inspectors and coal mine inspectors to do all they reasonably can to assist in securing situations for such applicants for work, and describe the character of work and cause of the scarcity of workmen, and to secure from the free employment offices the co-operation of the employers in labor in factories and mines. It shall be the duty of such factory inspectors and coal mine inspectors to immediately notify the superintendent of free employment offices of any and all vacancies or opportunities for employment offices of any and all vacancies or opportunities for employment that shall come to their notice.

SEC. 5. It shall be the duty of each superintendent of a free employment office to immediately put himself in communication with the principal manufacturers, merchants and other employ-

and to use all diligence in securing the co-operation of employers of labor, with the purposes and objects of employment offices. To this end it shall be competent for superintendents to advertise in the columns of daily newspapers for such situations as he has applicants to fill, and he may do so in a general way for the co-operation of large contractors and employers in such trade journals special publications as reach employers, whether such trade or special journals are published within the state of Illinois or not: Provided, that not more than one hundred dollars, or as much thereof as shall be necessary, shall be expended by the superintendent of any one such office for advertising any one year.

6. It shall be the duty of each such superintendent to report to the State bureau of labor statistics annually, not later than December first of each year, concerning the work of the office for the year ending October first of same year, together with a statement of the expenses of the same, including the cost of an interpreter when necessary, and such reports shall be published by the said bureau of labor statistics annually with the annual report. Each such superintendent shall also perform such other duties in the collection of statistics of labor as the board of the bureau of labor statistics may require.

7. No fee or compensation shall be charged or received, directly or indirectly, from persons applying for employment or through said free employment offices; and any superintendent, assistant superintendent or clerk, who shall accept, directly or indirectly, any fee or compensation from any applicant, or from any other representatives, shall be deemed guilty of a misdemeanor, and, upon conviction, shall be fined not less than \$25.00 nor more than \$50.00 dollars, and imprisoned in the county jail for not more than thirty days.

8. In no case shall the superintendent of any free employment office created by this act, furnish or cause to be furnished to workmen or other employees, to any applicant for help or to any employees are at that time on strike, or locked out; nor shall any list of names and addresses of applicants for employment be shown to any employer whose employees are on strike or locked out; nor shall such list be exposed where it can be copied or obtained by an employer whose employees are on strike or locked out.

9. The term "applicant for employment" as used in this act shall be construed to mean any person seeking work of any

awful character, and "applicant for help" shall mean any person or persons seeking help in any legitimate enterprise; and no person in this act shall be construed to limit the meaning of the word "work" to manual occupation, but it shall include professional service, and any and all other legitimate services.

SEC. 10. No person, firm or corporations in the cities named in section 1 of this act, shall open, operate or maintain a private employment agency for hire, or where a fee is charged, either applicants for employment or for help, without first having obtained a license from the secretary of state, which license shall be \$200 per annum, and who shall be required to give a bond for the faithful performance of the duties of private employment agent; and no such private agent shall print, publish, or place on any sign, window, or newspaper publication, a name similar to that of the Illinois free employment offices. And any person, firm or corporation violating the provisions of this act, or any part thereof, shall be deemed guilty of a misdemeanor, and on conviction shall be fined not less than \$50 nor more than \$100.

SEC. 11. Whenever, in the opinion of the board of commissioners of labor the superintendent of any free employment office is not duly diligent or energetic in the performance of his duties, they may summon such superintendent to appear before the board to show cause why he should not be recommended to the governor for removal, and unless such cause is clearly shown the said board may so recommend. In the consideration of such case, an unexplained low percentage of positions secured to applicants for positions and help registered, lack of intelligent interest in application to the work, or a general inaptitude or inefficiency shall be considered by said board a sufficient ground upon which to recommend a removal. And if, in the opinion of the governor such lack of efficiency cannot be remedied by reproof and discipline, he shall remove as recommended by said board: *Provided* that the governor may at any time remove any superintendent or assistant superintendent or clerk for cause.

SEC. 12. All such printing, blanks, blank books, stationery and postage as may be necessary for the proper conduct of the business of the offices herein created shall be furnished by the secretary of state upon requisition for the same made by the chief clerk of the Bureau of labor statistics.

Approved April 11, 1899. In force July 1, 1899.

WORKING OF THE DEPARTMENT OF LABOR.*

BY CARROLL D. WRIGHT.

ORIGIN.

The Order of the Knights of St. Crispin was in a flourishing condition in Massachusetts in 1868 and 1869. In the latter year the order petitioned the legislature for an act of incorporation, but the petition was rejected. In the same year two petitions had been filed with the legislature, praying for a ten-hour law, but these petitions were indefinitely postponed. The rejection of the petition of the Knights of St. Crispin was probably the immediate turning point for the establishment of the Massachusetts Bureau of Statistics of Labor. It is generally believed that the rejection of the petition fears were entertained by the leaders of the dominant party that the labor vote in the State might be alienated, and it was suggested by shrewd politicians that it might be politic to grant some concessions to the workmen. Whether this belief is based on fact or not, it is true that after the adverse action on the petitions of the order and of the ten-hour men a bill creating the bureau was suddenly introduced in the senate at a late day in the session. It was promptly rejected on the 12th day of June, but on the 14th the vote was reconsidered and the bill passed under a suspension of the rules. It was amended slightly in the house of representatives and passed that body and received the governor's approval on June 12, 1869. Thus was created by the act of the Massachusetts legislature the first office in the world whose function was the collection of information relating to social and industrial conditions.

The facts relative to the creation of that office indicate that the legislative branch of the state government had motives of its own for creating it, for, from all that can be gathered it seems to be certain that the immediate stimulus to the creation of the bureau was political necessity or expedience. The legis-

* Adapted from an article in the *Cosmopolitan Magazine* of June, 1892, with the consent of the publishers.

lature seized upon the recommendations which had been made by two special commissions, the first reporting February 7, 1866, recommending among other things, "that provision be made for the annual collection of reliable statistics in regard to the condition, prospects and wants of the industrial classes;" and the second, reporting January 1, 1867, unanimously recommending "that a bureau of statistics be established for the purpose of collecting and making available all facts relating to the industrial and social interests of the Commonwealth." These recommendations resulted in all that can be distinctly classified as official action prior to the creation of the Bureau of Statistics of Labor in Massachusetts, which dates from June 22, 1869. The functions of that bureau were defined by law as follows:

The duties of such bureau shall be to collect, assort, systematize and present an annual report to the legislature, on or before the first day of March in each year, statistical details relating to all departments of labor in the Commonwealth, especially in relation to the commercial, industrial, social, educational and sanitary condition of the laboring classes, and to the permanent prosperity of the productive industry of the Commonwealth.

The substance of this language finds a place in nearly every law creating a state bureau of similar character in this country, and also in the federal law organizing the United States Bureau of Labor and subsequently the Department of Labor. There are now in this country thirty-one state offices similar to that created in Massachusetts in 1869.*

The efforts looking to the establishment of a federal office date from April 10, 1871, when Honorable George F. Hoar of Massachusetts, then a member of the house of representatives, introduced a bill "to provide for the appointment of a commission on the subject of wages and hours of labor and the division of profits between labor and capital in the United States." On December 13, 1871, Mr. Hoar introduced his bill with certain amendments, and amendments were also proposed by Mr. T. C. C. Inger. This bill passed the house of representatives December 20, 1871, was brought into the senate January 8, 1872, and referred to the Committee on Education and Labor. It was reported back by Senator Sawyer, with certain minor amendments.

* The various state bureaus have been created as follows: Massachusetts, 1869; Pennsylvania, 1872; Connecticut, 1873; Missouri and Kentucky, 1876; Ohio, 1877; New Jersey, 1878; Illinois and Indiana, 1879; New York, California, Michigan and Wisconsin, 1883; Iowa, Maryland, 1884; Kansas, 1885; Rhode Island, Nebraska, North Carolina, Maine, Minnesota and Colorado, 1887; West Virginia, 1889; North Dakota and Idaho, 1890; Tennessee, Montana and New Hampshire, 1893; Washington, 1897; Virginia, 1898; Louisiana, 1900.

s, and other amendments were proposed by Senator Wilson. No more was done in that congress, which was the forty-third; but April 23, 1879, the legislature of Massachusetts sent a resolution to congress asking for the establishment of a national bureau of labor, and May 5th of the same year Mr. Murch, of Massachusetts, introduced a bill to establish a bureau of labor statistics. December 8, 1879, Senator Hoar introduced in the senate a bill to establish a labor commission. No action was taken upon the bill. April 12, 1880, in the house of representatives, Mr. Warner introduced a bill to establish a bureau of mines and minerals, a bureau of manufacturers, and a bureau of labor statistics in the Department of the Interior. This bill was never considered. January 9, 1882, in the house of representatives, Mr. Blair reintroduced Mr. Warner's bill. December 4, 1883, in the house, Mr. Blair introduced a bill to establish a bureau of statistics of labor, and December 10th of the same year, in the house of representatives, Mr. Willis introduced a bill to establish a bureau of labor and industries. December 11th, the same year, Mr. Hopkins, in the house of representatives, introduced a bill to establish and maintain a department of labor statistics. February 12, 1884, the Committee on Labor of the house, after considering various bills, reported the bill introduced by Mr. Hopkins, to establish and maintain a department of labor statistics, and the bill passed the house of representatives April 19, 1884. It was received in the senate on the 21st of the same month, and was reported back, April 25th, by Mr. Blair, Chairman of the Committee on Education and Labor. May 22, 1884, Senator Garland proposed certain amendments to this bill, as reported by Senator Aldrich. Out of these various bills introduced in 1884, an act establishing a bureau of labor in the Department of the Interior was framed and passed, and was signed by the President June 27, 1884. This act provided that "the commissioner of labor shall collect information upon the subject of labor, its relation to capital, the hours of labor and the earnings of working men and women, and the means of promoting their material, social, intellectual and moral prosperity." The earlier bills to which reference has been made were introduced as the result of the establishment of the Bureau of Statistics of Labor in Massachusetts; the later bills, those introduced in the year 1879 and subsequently, resulted from the various petitions of labor organizations.

The United States Bureau of Labor was organized in January,

1885, and the Commissioner of Labor, February 4, 1885, addressed a letter to the Honorable Secretary of the Interior declaring the policy of the office, in which he said:

It should be remembered that a bureau of labor cannot solve industrial or social problems, nor can it bring direct returns in any material way to the citizens of the country; but its work must be classed among educational efforts, and by judicious investigation and the fearless publication thereof it may and should enable the people to comprehend more clearly and more fully many of the problems which now vex them.

After the Bureau of Labor—as one of the bureaus of the Department of the Interior—had been in existence three years, it had shown the character of its work, the Knights of Labor demanded that Congress should create a department of labor, to be independent of any of the general departments. To this end Congressman O'Neill of Missouri introduced a bill to establish a department of labor, and this bill was promptly passed by the House and the Senate, and was approved June 13, 1888, thus providing that “there shall be at the seat of government a department of labor, the general design and duties of which shall be to acquire and diffuse among the people of the United States useful information on subjects connected with labor, in the most general and comprehensive sense of that word, and especially upon its relation to capital, the hours of labor, the earnings of laboring men and women, and the means of promoting their material, social, intellectual and moral prosperity.” The act defines the organization of the department and the duties of the commissioner, and provides for transferring the Bureau of Labor and its duties, etc., to the Department of Labor. The new department, therefore, simply continued the existence of the Bureau of Labor, but with independent functions. The head of the department was not placed in the cabinet, but occupied under the new law a position similar to that of the commissioner of agriculture before that department was made a cabinet office. The powers, duties and efficiency of the Department of Labor were placed upon a better footing than that which existed under the Bureau of Labor.

ORGANIZATION AND FUNCTIONS.

With this brief history of the origin of the United States Department of Labor, it is well to describe its organization and functions, as they really represent those of the various sub-bureaus. The Department is presided over by a commissioner

"The Commissioner of Labor;" there is a chief clerk, a chief office, stenographers, statistical experts, special agents, an interpreter, translator, and a proper corps of clerks, messengers, and watchmen. The grade of pay is the same as that pertaining to similar federal offices. The functions of the Department are to collect and publish information, as the law defines, relating to the economic, social, intellectual, and moral prosperity of laboring men and women. Under these broad powers the commissioner may undertake any investigation which in his judgment relates to the welfare of the working people of the country, and which can be carried out with the means and the force at his disposal. He is authorized by law to make an annual report covering the results of his investigations, and he may make, in his judgment, special reports on particular subjects whenever required to do so by the President or either house of Congress, or when he shall think the public interest in his charge requires a special report.

In November, 1895, the Department has published a monthly bulletin. This is published in accordance with a law enacted March 2, of the same year, as follows:

The Commissioner of Labor is hereby authorized to prepare and publish a bulletin of the Department of Labor, as to the conditions of labor in this and other countries, condensations of State and foreign labor reports, facts as to conditions of employment, and such other facts as may be deemed of value to the industrial interests of the country, and there shall be printed one edition of said bulletin, containing ten thousand copies of each issue of said bulletin, the distribution by the Department of Labor.

In accordance with the plan adopted, the Bulletin has at least four regular departments of information in each issue, as follows:

1. The results of original investigations conducted by the Department or its agents and experts.

2. A digest of state labor reports.

3. A digest of foreign labor and statistical documents.

4. The reproduction immediately after their passage of laws that affect the interests of the working people, whether enacted by congress or by state legislatures; and accompanying each of these is the reproduction of the decisions of courts interpreting labor laws or passing upon any subject which involves the rights of employer and employe.

The Department thus has three methods of announcing the results of its investigations. The only limitation to the work is that of means and equipment.

The information under any investigation is usually collected on properly prepared schedules of inquiry in the hands of special agents, by which means only the information which pertains to an investigation is secured. Rambling and nebulous observations, which would be likely to result from an investigation carried on by inquiries not properly scheduled, are thus avoided. The great advantages of this method have been demonstrated in many years of experience. Sometimes the peculiar conditions accompanying an investigation admit of the use of the mail, as a rule the attempt to collect information upon any given subject under investigation through the mail has proved a failure. With properly instructed special agents, who secure exactly the information required, who are on the spot to make any explanation to parties from whom data are sought, and who can consult the books of account at the establishment under investigation, the best and most accurate information can be secured, and in this condition for tabulation; in fact, sometimes under this method the tabulation is partially accomplished by the form of the inquiry and answer as shown by the schedule. It should be remembered that the Department of Labor does not attempt to secure information concerning all the people or all the establishments in a city or of the country. This character of work belongs to the census office and to the methods of general enumeration. The Department of Labor must secure specific information on specific topics.

The question is often asked, "How do people receive the agents of the department?" As a rule the reception is kind, even if one declines to give the information sought. As representative and special facts are required, it is always found that one establishment or one man from whom facts are desired declines to give them, some other establishment or some other man will be found sufficiently interested in the subject as present to furnish the information. As time progresses the declination becomes less frequent. The department never allows the names of persons furnishing facts to be given in its reports, but it seeks every method of verification open to it. Thus confidence is secured from the knowledge that in none of the reports have private interests been endangered. Through this confidence manufacturers in this and other countries have opened their books of account, their pay rolls, and their records to the agents of the department. Estimates, hear-say statements, what a man thinks relative to a fact that can be ascertained—in fine, all variable

ents—are carefully and strictly excluded and only original and positive data accepted. Even under this rigid method errors will creep into an official report, and sometimes a statistical conclusion will be, to a small degree at least, invalidated. Such an occurrence, however, is exceedingly rare in the history of the department.

After the information is brought into the office the schedules containing it are subjected to most careful scrutiny, for the purpose of ascertaining whether there are any logical faults or incongruities in it. If such are found the agent furnishing it is called upon to verify his work. What I mean by "logical faults or incongruities" is this: For instance, the product of an establishment may be given at a certain sum and the raw material at another, the two being entirely out of proportion. Under such circumstances a schedule could not be accepted, and there must be a re-examination. When the schedules are all verified the classifications and tabulations are made, every calculation being subjected to rigid verification in the preparation of copy for the press, and in the reading of the proof all original calculations must again be verified, all references re-examined, and every care taken to guard against typographical as well as clerical errors. Corrections made by the officers of the department in their analysis and by the most skilled expert in it are never allowed to be printed until they have been verified.

THE CHARACTER OF THE WORK.

The altruistic spirit of the age undertakes to ascertain what the different classes owe to each other, and statistical science helps to give the world to the answer. Generally three answers may be given to the inquiry. If we say social classes owe nothing to each other, then society retrogrades to civilized heathenism, and neither social science nor statistics has any place among the departments of human knowledge. (If the answer is that social classes owe everything to each other, then socialism is the logical result of social organization.) But if the answer is in the spirit of "as much as ye have done it unto the least of these, ye have done it unto me," then we have put the Christian religion into the domain of social science, have answered the question rationally, and must follow the light of facts in order that the action, either of governments or of communities, under the spirit of this answer shall not be either futile or absurd. Altruism is the rule of the day as

against the individualism of the past. Its tendency must be guided by facts, and facts can only be gained by the most faithful application of the statistical method, not only in the gathering thereof, but in the application. Personal observation, which to base conclusions is not sufficient. Very many illustrations might be given of this fact, but they are hardly essential. The assertion can be made, however, without fear of contradiction, that very many conclusions have been deduced from observation, which the facts, when properly classified, show were erroneous. The attempt to compare criminal conditions through criminal statistics, the use of city criminal statistics against those belonging to the country, the acceptance of a line of statistics relative to moral conditions when two or three are essential—all these directions in which the statistical method is used teach us that ordinary observation is too faulty, at least for legislative purposes. So the character of the work of the office having the functions of the Department of Labor must be based upon the Baconian idea of securing the facts before taking the action.

The character of the work of the Department has been criminal, involving the closest application of the statistical method. It has been free to a large extent, if not entirely, from any desire to argue a point. If there have been errors in the original investigations they have arisen from a misconception of what constitutes labor statistics. A glance at the different volumes already issued may perhaps give the best evidence as to what the Department has properly construed the character of its work. The Department has issued fifteen annual reports, special reports, and thirty-six bi-monthly bulletins.

The first annual report related to Industrial Depressions. The information for this report was collected and classified by a man entirely inexperienced, with a small amount of money at his command, with the anxiety that comes of the organization of a new work, with some jealousies as to the appointment of the man prejudicing its labors, with a critical watchfulness of friends and foe, and with the idea prevailing among labor organizations that the duty of the new office (then the Bureau of Labor) was in the nature of propagandism, and not of the educational function of gathering and publishing facts. This report upon Industrial Depressions, however, gave the Bureau of Labor a standing which convinced its friends that with proper financial equipment it could handle any reasonable investigation that might be

ed to it. The statistics published in that report bore upon various features involved in depressions. It brought out for the first time the relation of nations to each other as producers and consumers, the various influences bearing upon discontent, and gave a summary of the causes and a classification as to regularity of various depressions, etc., etc., every page bearing directly or indirectly upon the condition and the welfare of the working men and women of the country.

The second annual report (now out of print) related to convict labor as carried on in the penal institutions of the country. This investigation was directed by a joint resolution of Congress. It comprehended all the facts ascertainable relating to the employment of convicts in every institution of whatever grade in the United States in which the inmates were in any way employed in any kind of productive labor. The results were exceedingly valuable, and they brought out the clear and well-defined relation between convict labor and other labor, the importance of it, the character of it, the relation of cost to product, and all the other features which one might expect as bearing upon the subject. The report also contained a most valuable digest of the statistics of the United States and of countries in the past and for the present relating upon the employment of convicts. All the methods in use were fully and freely described and discussed and their advantages and disadvantages brought into relation. Certainly the whole report must be considered strictly as one of labor statistics.

The third annual report (now out of print) was the result of an investigation relating to strikes and lockouts occurring in the United States during the years 1881 to 1886, inclusive. The report was exhaustive and complete, so far as all the material relating to strikes and lockouts were concerned. It could not undertake to investigate the psychological elements of strikes, but as such psychological elements were illustrated in actions and results. The statistical method fails when it undertakes to analyze the inner motives of men; but it succeeds when it undertakes to record the results of those motives as they appear to the public. The report contained a digest of laws relating to strikes and boycotts, the course of the change of sentiment in judicial decisions on conspiracies, and a brief history of the great strikes of the past. Clearly, the report was one of labor statistics and nothing else.

The fourth annual report related to working women in two of the larger cities of the United States. It did not take to investigate the work of women in the lowest in pursuits, nor in the professions nor even in semi-professional callings, but gathered all the facts as to wages, expenses, health, moral and sanitary surroundings and conditions of results of work for those women popularly known as "factory girls"—perhaps the middle class of working women. The facts were almost entirely collected by women, who took every pains to verify the statements made to them, and the results are a body of facts relating to more than 17,000 women. The report also comprehended what was being done in the cities called out in the way of clubs, homes, etc., to assist working women out of employment or when otherwise requiring temporary encouragement. To my own mind, this report must be among the most valuable of those relating to labor.

The fifth annual report (now out of print) was upon the railroad labor of the country, and by it the results as to pay, the efforts of companies to assist their employes, the liabilities, accidents, and other features were brought out. Railroad corporations gave into the hands of the agents of the department their vouchers and pay rolls, from which were taken all the facts relating to wages and earnings. When it is understood that there are nearly a million employes of the different railroad corporations in the country, the importance of securing and presenting the facts relating to them becomes apparent. The vast number of workers on the great railroad systems of the country, in whose hands the welfare of the community in many respects is placed, and upon whose faithfulness in the discharge of duty the public limb so largely depend, is a body for which all facts should be ascertained. This report has never been studied as it should. It contains data of the greatest importance in the consideration of labor questions. The migration of labor—its tendency to change position and to seek new fields—was for the first time so far as my knowledge goes, brought out and statistically presented. A new thought was also brought to light, resulting in what may be called the "theoretical condition" of employes working under the wage system. Philosophically, so far as the discussion of labor questions and of certain features of socialism is concerned, the fifth annual report offers material never before published.

The sixth and seventh annual reports relate primarily to the cost of producing iron and steel and cognate products.

and glass in this and other countries. This work was ordered by Congress in the organic law of the Department. It took three years and a half of the most laborious efforts to collect and tabulate the information. The primary object of collecting the information relative to the cost of production, so that congressional action is concerned, was to ascertain the difference between the cost of producing articles abroad and in this country, that a more scientific conclusion might be reached as to the rates of duties necessary for the purposes of protection. Incidentally, however, along with the collection of the data required by Congress, the wages of those working in the industries comprehended by the investigation, as stated, and the cost of the living of workers in these industries were considered, and the bulk of the reports (the sixth and the seventh) was devoted to wages and the cost of living, comprehending in the aggregate the facts for more than 16,000 families. Thoroughly pre-eminent are these reports of labor statistics.

The eighth annual report was especially ordered by Congress, and related to industrial education in different countries. It set out the status of industrial education in the United States, in Austria, Belgium, France, Germany, Great Britain, Italy, Russia, Scandinavian countries, and Switzerland. It also dealt with kindergarten in relation to manual training, manual training in conjunction with book-work, manual training and trade instruction in reformatories, the effect of manual training and instruction upon the individual, and it contained an extensive bibliography of works treating upon industrial education. The report has been of great value in states where the subject of industrial education in any form has been discussed by legislatures. The ninth annual report related to building and loan associations, including under that general title all associations the objects of which were similar to those of building and loan associations, the general subject including co-operative banks, building loan associations, homestead aid associations, savings and loan associations, and other similar institutions. The report was comprehensive, and covered all the associations in the United States as they existed in 1892-93, with full tables giving facts as to number, series, shares, number and sex of shareholders, etc., etc. It also contained special interest-rate tables, average premium-rate tables, with a description of the various plans adopted for the payment of premiums and for the distribution of profits, as well as withdrawal plans. The report

also contained a chapter giving general legislation especially to building and loan associations.

The tenth annual report (now out of print) was a continuation of the third, relating to strikes and lockouts, and was in two volumes, Volume I containing an analysis of all tables and detail tables of all strikes and lockouts occurring in the United States from January 1, 1887, to June 30, 1894. Volume II contained summaries of the detail tables given in Volume I. The analysis reclassified and resummarized the facts contained in the third annual report, giving strikes and lockouts from January 1, 1881, to December 31, 1886. The tenth, therefore, comprehended all strikes and lockouts from 1881 to June 30, 1894.

The eleventh annual report was the result of an investigation concerning the work and wages of men, women, and children, classifying the occupations and earnings of women and children and men and dealing with the relative efficiency of women and children and men engaged in the same occupation, the comparison of earnings of women and children and men of the same grade of efficiency, the reasons usually given for the employment of women and girls, the hours per week worked in establishments, and the different occupations followed by women and children.

The twelfth annual report was the result of instruction from Congress authorizing the Commissioner of Labor to make an investigation relating to the economic aspects of the liquor problem. The report gave the production and consumption of liquors, the traffic in liquors, the revenue derived from the production of and the traffic in the same, the experience and policy of employers relative to the use of intoxicants, and various other matters relating to license fees or special taxes, fines, etc. It also gave the laws regulating the revenue derived from liquor production and traffic in the different states. The report was for the period ending June 30, 1897.

The thirteenth annual report, entitled *Hand and Machine Labor*, was also the result of an investigation authorized by a resolution of Congress, under the provisions of which the Commissioner of Labor was authorized and directed to investigate and make report upon the effect of the use of machinery upon the cost of production, the relative productive power of hand and machine labor, the cost of manual and machine power as they are used in the productive industries, etc. This resolution was approved August 15, 1894, and after between three and four years of very difficult labor the results of the investigation

d in October, 1898, in the thirteenth annual report. The
as published in two volumes.

fourteenth annual report, published in December, 1899,
to water, gas and electric light plants under private and
pal ownership, and was designed to bring out the essential
relating to such works in the United States. The report
result of an agreement by the various commissioners of
t their annual convention held in Albany in June, 1896.
impossible to make such a report comprehensive in all its
yet the department was able to bring out the facts for the
tentative private and municipal works under the various
tions as they existed in the United States at the time of
estigation.

fifteenth annual report is the only compilation the depart-
as ever indulged in. All its works other than this have
e results of original inquiry and investigation. The fif-
annual gives the wages and hours of labor in the prin-
ommercial countries of the world for as many years
ible, the facts being taken from authenticated official
of the countries involved in the compilation. In many
es the quotations of rates run back many years, and in all
es, so far as possible, they are brought down to the sum-
1900.

sixteenth annual report is now in course of preparation,
vers the statistics of strikes and lockouts from June 30,
e date at which the investigation resulting in the tenth
report ended), to December 31, 1900. The report will
the summaries contained in the third and tenth reports.
ry of strikes prior to 1880, and also the attitude of the
relative to conspiracy, etc., will be given. When this
is published, which will not be until the winter of 1901, the
ment will have an exhibit of the strikes and lockouts in the
States from January 1, 1881, to December 31, 1900, a
of twenty years.

first of the special reports published by the department
led A Report upon the Statistics of and Relating to Mar-
nd Divorce, and was sent to Congress in 1889 under special
on of an act of Congress to enable the commissioner to
he report. This document covers the statistics of mar-
nd divorce in the United States for twenty years, from
1886 inclusive, and it comprehends also statistics and laws
r countries. To make it required the collection of data

from libels for divorce and divorce dockets of more than courts in the United States having divorce jurisdiction. has been said by my friends in labor organizations condemn of this report, not as to its character, but as to the propriety of the department of labor making it. The answer is very emphatic, and, to my mind, thoroughly comprehensive: that Congress found the department of labor the only one connected with the government having the proper machinery for carrying out its purposes; further, if there is any subject in which labor should be actively interested, and which concerns the happiness of the working man, it is the sacredness and the permanency of the family relations. To my own mind, the report upon marriage and divorce is as thoroughly—although on the first appearance somewhat remotely—essential to labor in all its interests as the reports upon wages or cost of living.

The second special report is one that has been in very great demand. It was originally published in 1892, and comprehended the labor laws of the United States government and of the different states, giving such laws in full, together with annotations relative to decisions of courts affecting them. By a concurrent resolution adopted by Congress March 5, 1896, a second revised edition of the second special report was published.

The third special report (now out of print) was simply an analysis of all state labor reports that had been published since 1893, and was made with special reference to the needs of the department. No subsequent analysis has been made, but an analytical list of the contents of the various annual and biennial reports of the states having bureaus of statistics of labor or similar offices is in course of preparation. These volumes number over four hundred.

The fourth special report related to compulsory insurance in Germany; the fifth special, to the Gothenburg system of regulating the liquor traffic; the sixth special, to the phosphate industry of the United States; the seventh special, to the slums of the cities of New York, Chicago, Philadelphia and Baltimore; the eighth special, to the housing of the working people, and the ninth special consisted of a study of the Italians in the city of Chicago.

In addition to the annual and special reports just enumerated, thirty-three numbers of the Bimonthly Bulletin have also been issued. The leading articles in these bulletins are as follows:

- Private and public debt in the United State., by George K. Holmes.
- Employer and Employee under the common law, by N. H. Olmsted and S. D. Fessenden.
- The poor colonies of Holland, by J. Howard Gore, Ph. D.
- The industrial revolution in Japan, by William Eleroy Curtis.
- Notes concerning the money of the U. S. and other countries, by W. C. Hunt.
- The wealth and receipts and expenses of the U. S., by W. M. Steuart.
- Industrial communities; Coal Mining Co. of Anzin, by W. F. Willoughby.
- Industrial communities; Coal Mining Co. of Blanzey, by W. F. Willoughby.
- The sweating system, by Henry White.
- Convict labor.
- Industrial communities: Krupp Iron and Steel Works, by W. F. Willoughby.
- Industrial communities: Familistere Society of Guise, by W. F. Willoughby.
- Cooperative distribution, by Edward W. Bemis, Ph. D.
- Industrial communities: Various communities, by W. F. Willoughby.
- Rates of wages paid under public and private contract, by Ethelbert Stewart.
- Conciliation and arbitration in the boot and shoe industry, by T. A. Carroll.
- Railway relief departments, by Emory R. Johnson, Ph. D.
- The padrone system and padrone banks, by John Koren.
- The Dutch Society of General Welfare, by J. Howard Gore, Ph. D.
- Condition of the Negro in various cities.
- Building and loan associations.
- Workers at gainful occupations at the census of 1870, 1880, and 1890, by W. C. Hunt.
- Public baths in Europe, by Edward Mussey Hartwell, Ph. D., M. D.
- The inspection of factories and workshops in the U. S., by W. F. Willoughby.
- Mutual rights and duties of parents and children, guardianship, etc., under the law, by F. J. Stimson.
- The municipal or cooperative restaurant of Grenoble, France, by C. O. Ward.
- The anthracite mine laborers, by G. O. Virtue, Ph. D.
- The Negroes of Farmville, Va.; A social study, by W. E. B. Du Bois, Ph. D.
- Incomes, wages, and rents in Montreal, by Herbert Brown Ames, B. A.

- No. 15. Boarding homes and clubs for working women, by Mary S. guson.
The trade-union label, by John Graham Brooks.
- No. 16. The Alaskan gold fields and opportunities for capital and la
by S. C. Dunham.
- No. 17. Brotherhood relief and insurance of railway employes, by E
Johnson, Ph. D.
The nations of Antwerp, by J. Howard Gore, Ph. D.
- No. 18. Wages in the United States and Europe, 1870 to 1898.
- No. 19. The Alaskan gold fields and opportunities for capital and labo
S. C. Dunham.
Mutual relief and benefit associations in the printing trade, b
S. Waudby.
- No. 20. Condition of railway labor in Europe, by Walter E. Weyl, Ph
- No. 21. Pawnbroking in Europe and the United States, by W. R. Pa
son, Ph. D.
- No. 22. Benefit features of American trade unions, by Edward W. Be
Ph. D.
The Negro in the black belt: Some social sketches, by W. E
Du Bois, Ph. D.
Wages in Lyons, France, 1870 to 1896.
- No. 23. Attitude of women's clubs, etc., toward social economics
Ellen M. Henrotin.
The production of paper and pulp in the U. S. from January
June 30, 1898.
- No. 24. Statistics of cities.
- No. 25. Foreign labor laws: Great Britain and France, by W. F.
loughby.
- No. 26. Protection of workmen in their employment, by Stephen D.
senden:
Foreign labor laws; Belgium and Switzerland, by W. F.
loughby.
- No. 27. Wholesale prices: 1890 to 1899, by Roland F. Falkner, Ph. D.
Foreign labor laws: Germany, by W. F. Willoughby.
- No. 28. Voluntary conciliation and arbitration in Great Britain, by J
McPherson.
System of adjusting wages, etc., in certain rolling mills, by J
Nutt.
Foreign labor laws: Austria, by W. F. Willoughby.
- No. 29. Trusts and industrial combinations, by J. W. Jenks, Ph. D.
The Yukon and Nome gold regions, by S. C. Dunham.
Labor Day, by Miss M. C. de Graffenried.
- No. 30. Trend of wages from 1891 to 1900.
Statistics of cities.
Foreign labor laws: Various European countries, by W. F.
loughby.

31. Betterment of industrial conditions, by V. H. Olmsted.
Present status of employers' liability in the U. S., by S. D. Pes-
senden.
Condition of railway labor in Italy, by Dr. Luigi Einaudi.
32. Accidents to labor as regulated by law in the U. S., by W. F.
Willoughby.
Prices of commodities and rates of wages in Manila.
The Negroes of Sandy Spring, Md.: A social study, by W. T.
Thom, Ph. D.
The British Workmen's Compensation Act and its operation, by
A. Maurice Low.
33. Foreign labor laws: Australasia and Canada, by W. F. Wil-
loughby.
The British Conspiracy and Protection of Property Act and its
operation, by A. Maurice Low.

In addition to the annual and special reports and the bimonthly
Bulletin, a large part of the force of the Department was engaged
nearly a year, in association with the Senate Committee on
Finance, in collecting for that committee the statistics of wages
and prices for a period of 52 years (from 1840 to 1891, inclusive)
which were published in seven volumes. It has also made some
reports in accordance with Senate resolutions calling for the same,
namely, one on Total Cost and Labor Cost of Transformation in
the Production of Certain Articles in the United States, Great
Britain, and Belgium; one on the Cost of Producing White Pine
Lumber in the United States and Canada; and one on the Effect
of the International Copyright Law in the United States.

To my mind, all the facts which have so far been gathered and
published by the Department bear, either directly or indirectly,
on the industrial and humanitarian advance of the age, and are
essential in any intelligent discussion of what is popularly
known as the "labor question." Labor statistics must not be
considered as simply statistics relating to narrow fields, but, in
the language of the law creating the Department of Labor, they
should relate to the "material, social, intellectual and moral pros-
perity" of all concerned; and this means the material, social,
intellectual, and moral prosperity of society itself. If the indus-
trial elements of a nation are not progressing intellectually and
morally to a higher social plane, little can be expected from all
educational efforts which may be made under the conven-
tional and academic methods. There must be the broader educa-
tion which comprehends the industrial freedom of men and
women as a prerequisite to securing intellectual and political
freedom.

Kindly criticism is sometimes made upon the Department and its friends that it does not do this or that—that it has not set up investigations that are most pressing in their nature. The answer to this is that the Department is limited in many directions. It would be a very great piece of maladministration to undertake an investigation that could not be carried to reasonable completeness—to undertake a work which the Department has neither the means nor the equipment to carry on, and very many of the suggestions which are in the kindest way made to it are suggestions which would involve the expenditure of hundreds of thousands of dollars to carry out, and the employment of a few hundreds of people instead of the use of the means and the equipment at the command of the Department. There has never been a suggestion made relative to the work of the Department that the commissioner would not gladly have carried out had he had the means to do so. And yet Congress has been very liberal. Beginning with \$25,000 as the annual appropriation for the Bureau of Labor, Congress now appropriates more than \$175,000 exclusive of printing, for the administration of the Department, and so far as I know there has been no inclination on the part of the House, the Senate, or the President to in any way abridge or interfere with the work of the Department. On the other hand, it has met with the most generous confidence on the part of Congress and of the President, and been aided in all reasonable ways in bringing its work to a high standard of excellence.

This is in evidence through the continued demand for reports of the Department. Congress is constantly supplying new editions of exhausted numbers, so that on the whole the Department is able to furnish libraries and students with most of the publications. One of the most gratifying demands comes from reading clubs which are being established rapidly all over the country by labor organizations. The study of economic facts by such organizations ought to be stimulated in every way, and the Federal Government, through its Congress, does not hesitate to meet this demand.

The question is often asked why the Department does not furnish data each year showing the condition of labor and industrial matters continuously. This would be a desirable result to be accomplished, but it would involve a very large expenditure of money, and practically a census of manufacturing establishments. This can be done only at the decennial census of the United States. In order to give complete statements of an i

the Department would have to canvass all the establishments in that industry, and hence in all industries. It will be seen at once that this is an impossibility. The Department is, therefore, content to make special investigations each year, the results of which, if of sufficient importance in volume and value, are published in its annual report, and if of minor importance in volume, though maybe not in value, they are published in the bimonthly Bulletin. The special reports authorized by Congress enable the Department to publish the results of special investigations which cannot be included in either of the other forms of publication.

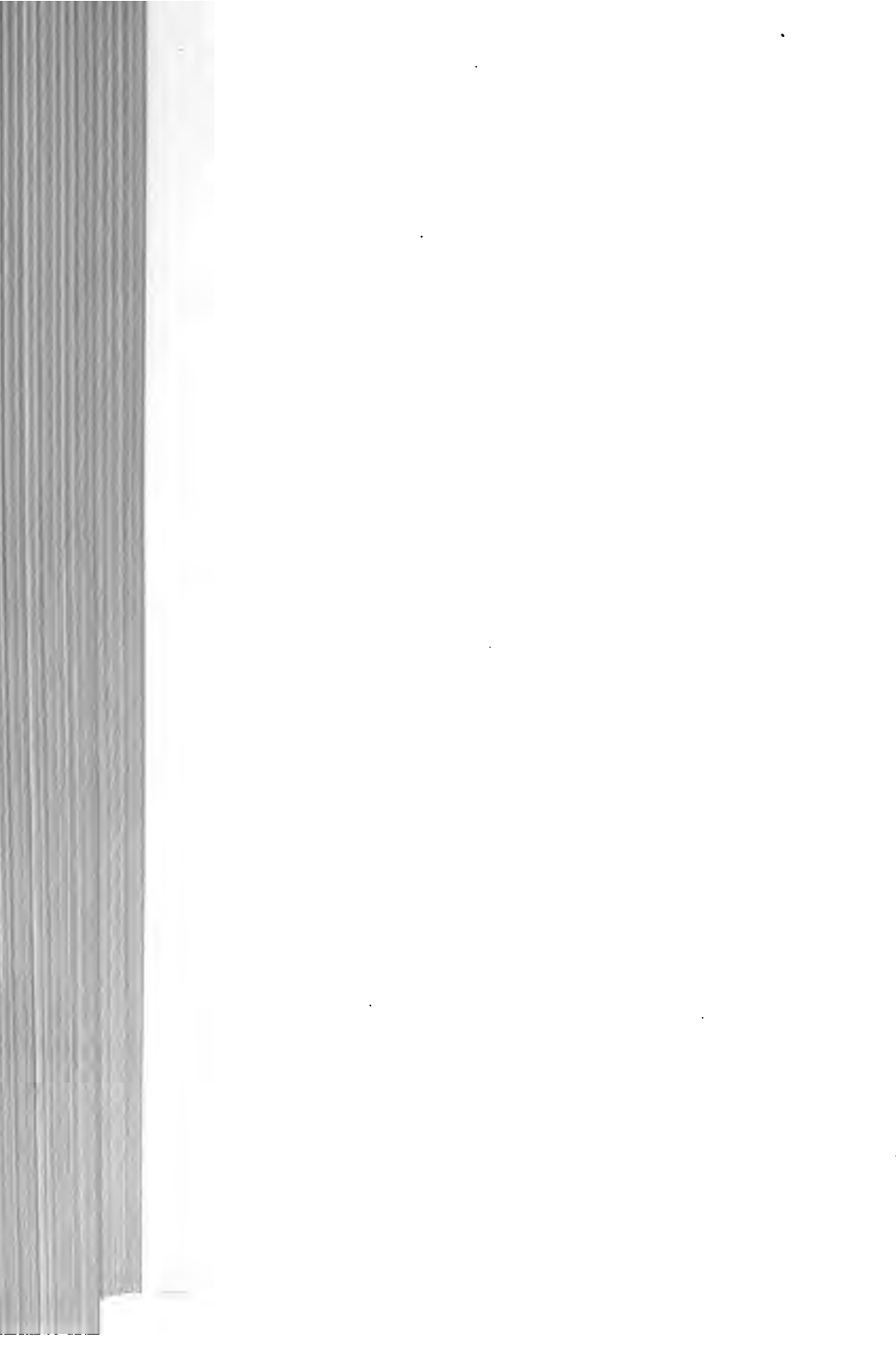
The Department can determine many things by the statistical method, and it must work emphatically on that method. It is often said that it should undertake the agitation of certain features of reform; in other words that it should become the instrument of propagandism. But when this proposition is made, the question should be asked, Whose idea of reform should be adopted, of what proposition should it become the propagandist, to what extent should it argue for or against the platforms of this or that party or organization? It seems to me that all men who comprehend the value of accurate knowledge must see at once that for the Department to enter upon such a course would result in its immediate abolition; that should it become the advocate of any theory it would thereby become partisan in its work and thus destroy its own efficiency. If the Department advocates a proposition it necessarily takes the position of an advocate, and hence a partisan, and lays itself open to the charge of using collected facts to substantiate and bolster up its position, having neglected to secure facts which might antagonize such position. Whenever the head of the Department of Labor attempts to turn its efforts in the direction of sustaining or of defeating any public measure, its usefulness will be past and its days will be few. It is only by the fearless publication of facts, without regard to the influence those facts may have upon any party's position or any partisan's views, that it can justify its continued existence, and its future usefulness will depend upon the non-partisan character of its personnel. And what has been said in regard to the Federal office applies with equal force to the State office of kindred nature. Practically, the Federal and State offices are working along legitimate lines. They have published over 400 volumes.

The British, French, Belgian and Austrian governments, as well as those of New Zealand, New South Wales, the Dominion

of Canada, and the Province of Ontario, Canada, have followed the example of the United States in establishing bureaus of statistics of labor, usually adopting the American plan. The statistical bureaus of several other foreign governments, particularly Germany, Italy and Sweden publish labor statistics as a part of their regular official work. All these offices are working successfully, and are furnishing economic data which are used by legislatures of different governments and wherever facts are essential for the proper discussion or consideration of industrial conditions.

The future of usefulness open to this chain of offices is hopeful, indeed, and it is apparent that they are engaged in a grand mission in securing that information which is essential for proper understanding of industrial conditions. The results they are bringing out constitute a most valuable series of contributions to social and political science. The popular education of masses in the elementary facts of political and economic science is the greatest educational end of the day. The bureaus of statistics of labor are emphatically in the line of facilitating this grand work by their faithful investigations into all the conditions where facts should be known and into all causes of bad conditions of whatever nature, and by their fearless promulgation of the results of their investigations. To attempt to turn such sphere of labor to a base purpose is a crime not easily punished by law, but which can be punished by an unwritten law which reaches the violator through a decree more to be dreaded than any merely judicial order or sentence—the sentence of public opinion passes upon the man who prostitutes a public trust in the cause of humanity.

LABOR LAWS.



LABOR LAWS.

SEC. 122.—*Biennial Reports of Officers—When Made.*—The regular annual reports of the various officers, * * * * shall be laid before the governor of the state, in the odd numbered years at the following times: On or before October first those of the * * * and the Commissioner of Labor Statistics.

SEC. 125.—*Number of copies to be printed.*—There shall be printed; * * of the report of the bureau of labor statistics, 4,000 copies; of reports, 500 copies of the report of the bureau of labor statistics, shall be bound in cloth; all other reports shall be bound in paper covers.

CHAPTER I.

ASSESSMENT OF TAXES.

SEC. 1304. *Exemptions.*—The following classes of property are not to be taxed.

* * * * *
Obligations for rent not yet due, in the hands of original payees, state libraries to the actual value of \$300; family pictures; household furniture to the actual value of \$300, and kitchen furniture; beds and bedding, requisite for each family; all wearing apparel in actual use; but the exemptions allowed in this sub-division shall not be held to apply to hotels and boarding houses except so far as said exempted classes of property shall be for the actual use of the family managing the same.

* * * * *
The tools of any mechanic, not in any case to exceed \$300 in actual value.

OF WORKING ROADS.

SEC. 1535. *Days work.*—Eight hours service for a man, or man and horse, shall be required for a days work; but except on extraordinary occasions no person shall be required to go more than three miles from his place of residence to work.

TRADES UNIONS.

SEC. 1642. *Organization, purposes, name.*—Any three or more persons of full age, a majority of whom shall be citizens of the state, may incorporate themselves for the establishment of * * * * trades unions or other organizations * * * * farmers, grangers, of a benevolent * * * * benefic, * * * military or religious character, by signing, acknowledging and filing for record with the county recorder * * * stating the name by which the * * association shall be known, which shall not be the same as that of any such organization previously existing, * * and the names of the officers for the first year.

AUTOMATIC COUPLERS AND BRAKES.

SEC. 2080. *On all cars.*—After January 1, 1898, no corporation, company or person, operating a railroad, or any transportation company * * shall have upon any railroad in this state any car that is not equipped with such safety automatic coupler.

SEC. 2081. *Driver brake on engines.*—No corporation * * * operating any line of railroad in the state shall use any locomotive engine * in the state, that is not equipped with a * * * driver brake.

SEC. 2082. *Power brake on cars.*—No corporation, * * * in this state shall run any train of cars, that shall not have * * * some of efficient automatic power brake to enable the engineer to control the train without requiring brakemen to go between the ends or on the top of the train to use the hand-brake.

SEC. 2083. *Penalty.*—Any corporation * * * in this state running a train of cars * * * contrary to the provisions of the four preceding sections, shall be guilty of a misdemeanor and subject to a fine of not less than \$500 nor more than \$1,000 for each and every offense. * * *

Any railway employee who may be injured by the running of such engine, train or car contrary to the provisions of said sections shall not be considered as waiving his right to recover damage by continuing in the employ of such corporation, * * operating such engine, train or cars. [G. A. Ch. § 6.]

SEC. 2091. *Taxes paid in labor or supplies.*— * * * Labor shall have a lien upon any tax voted in aid of a railroad company for the amount due them for labor performed in the construction of said railroad. [Same, § 9.]

CHAPTER 8.

OF THE BUREAU OF LABOR STATISTICS.

SECTION 2469. *Commissioner.*—The bureau of labor statistics shall be under the control of a commissioner, biennially appointed by the governor by and with the advice and consent of the executive council, whose term of office shall commence on the first day of April in each even-numbered year and continue for two years, and until his successor is appointed and qualified. He may be removed for cause by the governor, with the advice of the executive council, record thereof being made in his office; any vacancy shall be filled in the same manner as the original appointment. He shall give bond in the sum of two thousand dollars with sureties to be approved by the governor, conditioned for the faithful discharge of the duties of his office, and take the oath prescribed by law. He shall have an office in the capitol and safely keep all records, papers, documents, correspondence, and other property pertaining to or coming into his hands by virtue of his office, and deliver the same to his successor, except as hereinafter provided.

SEC. 2470. *Duties—report.*—The duties of said commissioner shall be to collect, assort, systematize, and present in biennial reports to the governor on or before the first day of October preceding each regular meeting of the general assembly, statistical details relating to all departments of labor in the state, especially in its relations to the commercial, social, educational, and sanitary conditions of the laboring classes, and to the permanent prosperity of the mechanical, manufacturing, and productive industries.

the state, and he shall as fully as is practicable collect such information reliable reports from each county in the state, the amount and condition of the mechanical and manufacturing interests, the value and location of various manufacturing and coal productions of the state, also sites offering natural or acquired advantages for the profitable location and operation of different branches of industry; he shall by correspondence with interested parties in other parts of the United States, impart to them such information as may tend to induce the location of mechanical and producing enterprises within the state, together with such other information as shall tend to increase the productions, and consequent employment of producers; and in his biennial report he shall give a statement of the business of the bureau during the last regular report, and shall compile and publish therein such information as may be considered of value to the industrial interests of the state, the number of laborers and mechanics employed, the number of apprentices in each trade, with the nativity of such laborers, mechanics' wages earned, the saving from the same; with age and sex of laborers employed, the number and character of accidents, the sanitary condition of institutions where labor is employed, the restrictions, if any, which are put upon apprentices when indentured, the proportion of married laborers and mechanics who live in rented houses, with the average annual rental and the value of property owned by laborers and mechanics; and he shall include in such report what progress has been made with schools now in operation for the instruction of students in the mechanic arts and what methods have been found most practical, with details thereof. Such report shall not contain more than six hundred printed pages, and shall be of the proper form, and distributed in the manner provided by law.

SEC. 2471. *Power to secure evidence*.—The commissioner of the bureau of labor statistics shall have the power to issue subpoenas, administer oaths, and take testimony in all matters relating to the duties herein required by the bureau, said testimony to be taken in some suitable place in the vicinity in which testimony is applicable. Witnesses subpoenaed and testifying before the commissioner of the bureau shall be paid the same fees as witnesses before a justice court, such payment to be made out of the contingent fund of the bureau in advance, but such expense for witnesses shall not exceed \$100 annually. Any person duly subpoenaed under the provisions of this act, who shall wilfully neglect or refuse to attend or testify at the time and place named in subpoena shall be deemed guilty of a misdemeanor, and upon conviction thereof, before any court of competent jurisdiction, shall be punished by a fine not exceeding \$50 and costs of prosecution, or imprisonment in the county jail not exceeding thirty days; provided, however, that no witness shall be compelled to go outside the county in which he resides to testify.

SEC. 2472. *Right to enter premises*.—The commissioner of the bureau of labor statistics shall have the power, upon the complaint of two or more persons, or upon his failure to otherwise obtain information in accordance with the provisions of this act, to enter any factory or mill, workshop, mine, or business house, public or private work, when the same is open for operation, upon a request being made in writing, for the purpose of gathering facts and statistics such as are contemplated by this act, and to examine into the methods of protection from danger to employees, and the sanitary

conditions in and around such buildings and places, and make a report thereof, and any owner or occupant of such factory or mill, workshop, mine, store, business house, public or private work, or any agent or employee of such owner or occupant who shall refuse to allow any officer or employee of said bureau to so enter, or who shall hinder him, or in any way deter him from collecting information, shall be deemed guilty of a misdemeanor, and upon conviction thereof, before any court of competent jurisdiction, shall be punished by a fine of not exceeding \$100 and costs of prosecution, or imprisonment in the county jail not exceeding thirty days.

SEC. 2473. *Meaning of terms.*—The expression "factory," "mine," "workshop," "mine," "store," "business house," and "public or private work," as used in this act, shall be construed to mean any factory, mill, workshop, mine, store, business house, public or private work, where five or more wage-earners are employed for a certain stipulated compensation.

SEC. 2474. *Reports of Bureau.*—It shall be the duty of every owner, operator or manager of every factory, mill, workshop, mine, store, business house, public or private work, or any other establishment where labor is employed as herein provided, to make to the bureau, upon blanks furnished by said bureau, such reports and returns as said bureau may require for the purpose of compiling such labor statistics as are contemplated in this act, and the owner, operator or business manager shall make such reports and returns within sixty days from the receipt of blanks furnished by the commissioner, and shall certify under oath to the correctness of the same. Any owner, operator, or manager of such factory, mill, workshop, mine, store, business house, public or private works as herein stated, who shall neglect or refuse to furnish to the commissioner of labor such reports or returns as may be required by the following blank, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding \$100 and costs of prosecution, or imprisoned in the county jail not exceeding thirty days.

BLANK.

Name of firm or corporation Number of hands employed during year ending December 31, males, females, apprentices Total amount of wages paid during year ending December 31, \$ Total amount of wages paid previous year, \$ Any general increase or reduction of wages during the past year? If so, what per cent of increase or reduction? Cause of increase or reduction Any increase or decrease in business during past year? What means are provided for the escape of employes in case of fire? What measures are taken to prevent accident to employes from machinery? How are buildings ventilated? Are separate water-closets and wash rooms provided for the different sexes? Number of weeks during past year business was run on full time with full force Number of weeks during past year business was run on short time or with reduced force Number of weeks during past year business was suspended Number of strikes during year ending December 31, number of employes involved, alleged cause, result How many days of strike continue, and what was loss of wages in consequence thereof? Was any property destroyed, and if so, its value?

c. 2475. *Use of information.*—In the reports of the commissioners no shall be made of names of individuals, firms or corporations supplying information called for by sections 2470 and 2471 of this act, such information being deemed confidential and not for the purpose of disclosing internal affairs, and any officer or employe of the bureau of labor statistics violating this provision shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in a sum not exceeding \$500 and costs of prosecution, or by imprisonment in the county jail not exceeding one year.

c. 2476. *Reports and records preserved.*—No report or return made to the bureau in accordance with the provisions of this chapter, and no schedule, record or document, gathered or returned by its officers or employes shall be destroyed within two years of the collection or receipt thereof. At the expiration of two years all records, schedules or papers accumulating in the bureau during said period that may be considered of no value by the commissioner may be destroyed, provided the authority of the executive council be first obtained for such destruction.

c. 2477. *Compensation and expenses.*—Said commissioners shall receive a salary of \$1,500 per annum, and shall be allowed a deputy at a salary of \$1,000 per annum in lieu of clerk hire, payable monthly, and necessary expenses, stationery, and office expenses, the said salary and expenses to be paid by the state as the salary and expenses of other state officers are provided for. The commissioner, or any officer or employe of the bureau of labor statistics, shall be allowed in addition to their salaries, their actual and necessary traveling expenses while in the performance of their duties; said expenses to be audited by the executive council and paid out of the general fund of the state upon a voucher verified by the commissioner, provided that the total of such expenses for officers and employes shall not exceed \$500 per annum.

c. 2975. *Subject to Mechanics Liens.*—The homestead is subject to mechanics' liens for work, labor or material done or furnished exclusively for the improvement of the same. [C. '73, § 1991; R., § 2280; C. '51, § 1009.]

CHAPTER 8.

OF MECHANICS' LIENS.

SECTION 3088. *Collateral Security.*—No person shall be entitled to a mechanic's lien who, at the time of making or executing a contract for furnishing material or performing labor, or during the progress of the work, or on, building or other improvement, shall take any collateral security for such contract. But after the completion of such work, and when the contractor or other person shall have become entitled to claim or establish a lien, the taking of such or other security shall not affect the right thereto, and such new security shall, by express agreement, be given and received in full of such lien. [16 G. A., ch. 100, § 2; C. '73, § 2129; R., § 1845; C. '51, § 1009.]

c. 3045. *Payable in money or labor—Due bills.*—Instruments by which a contractor promises to pay a sum of money in property or labor, or to pay for property or labor, or acknowledge property, labor or money to be due to another, are negotiable instruments, with all the incidents of negotiability, whenever it is manifest from their terms that such was the intent of

the maker; but the use of the technical word "order" or "bearer" will not manifest such intent.

SEC. 3053. *Holidays*.—The first day of the week, called Sunday, the 1st day of January, the 22d day of February, the 30th day of May, the 1st day of July, the first Monday in September, the 25th day of December, the day of the general election, and any day appointed by the governor of the state, or by the president of the United States as a day of fasting or of giving shall be regarded as holidays.

SEC. 3057. *Tender of labor or property*.—When a contract for labor or for the payment or delivery of property other than money, does not specify a place of payment, the maker may tender the labor or property at the place where the payee resides at the time of making the contract, or at the residence of the payee at the time of performance of the contract, or where the assignee of the contract resides when it becomes due, but if the property in the case is too ponderous to be conveniently transported, or if they had no place of residence within the state at the time of making the contract, or if the assignee of a written contract has no known place of residence within the state at the time of performance the maker may tender the property at the place where he resided at the time of making the contract.

SEC. 3079. *Claims for services preferred—dividends—reports—liquidation*.—If the claim of any creditor is for personal services rendered by the assignor within ninety days, next preceding the execution of the assignment, it shall be paid in full. [20 G. A., ch. 124; C. '73, § 2122; R., § 183.]

SEC. 3089. *Who may have lien*.—Every person who shall do any work upon or furnish any materials, machinery or fixtures for any building, erection or other improvement upon land, including those engaged in the construction or repair of any work of internal improvement, and those employed in grading any land or lot by virtue of any contract with the owner, agent, trustee, contractor or sub-contractor, upon complying with the provisions of this chapter, shall have for his labor done, or material, machinery or fixtures furnished, a lien upon such building, erection or improvement, and upon the land belonging to such owner on which the same is situated, upon the land or lot so graded to secure payment for such labor done, or material, machinery or fixtures furnished.

SEC. 3090. *Extent of lien; leasehold interest*.—The entire land upon which any such building, erection or other improvement is situated, including that portion not covered therewith, shall be subject to all liens created by this chapter to the extent of the interest therein of the person for whose benefit such labor was done, or things furnished; and when such interest is only a leasehold the forfeiture of such lease for the non-payment of rent, or for non-compliance with any of the other conditions therein shall not affect or impair such liens upon such improvement, but the same may be satisfied by the purchaser of such improvement, and he may satisfy such liens and be moved away by the purchaser within thirty days after the sale thereof.

SEC. 3162. *Wages of wife—actions by*.—A wife may receive the wages for her personal labor, and maintain an action therefor in her own name, and hold the same in her own right, and may prosecute and defend such actions for the preservation and protection of her rights and property, if unmarried.

SEC. 3229. *Indenture*.—Any minor child may be bound to service

tainment of the age of majority, by a written indenture, specifying the age of the minor, the terms of agreement, and, if more than twelve years of age, and not a pauper, the indenture must be signed by him of his own free

C. 3230. *Consent of parent or guardian.*—A written consent must be obtained to such agreement and signed by the father, but if he is dead or has abandoned his family or is for any cause incapacitated, by the mother, or if he is dead or incapacitated, by the guardian, or if there is none, then by the clerk of the district court.

C. 3231.—The clerk of the district court may bind minors who are paupers until they have attained the age of majority, without obtaining their consent, and the indenture must in that case be signed by the master and said clerk.

C. 3191. *Payments.*—Where a contract for the personal services of a laborer has been made with him alone, and the services are afterwards performed, payment therefor made to him, in accordance with the terms of the contract, is a full satisfaction therefor, and the parent or guardian cannot sue for a second time. [C. '73, § 2240; R., § 2542; C. 751, § 1490.]

C. 3996. *Stay of execution—how effected.*—On all judgments for the recovery of money, except those rendered on any appeal or writ of error, in favor of a laborer or mechanic for his wages. * * * * *

* * * * * There may be a stay of execution, if the defendant therein shall, within ten days from the entry of judgment, procure one or more sufficient freehold sureties to enter into a bond, acknowledging themselves security for the defendant for the payment of the judgment interests and costs from the time of rendering judgment until paid, as follows:

If the sum for which judgment was rendered, inclusive of costs does not exceed one hundred dollars, three months;

If such sum and costs exceed one hundred dollars, six months. [C. 3061; R., § 3293.]

CHAPTER 3.

OF EXEMPTIONS.

SECTION 4008. *Other exemptions.*—If the debtor is a resident of this state and the head of a family he may hold exempt from execution the following property: All wearing apparel of himself and family, * * * * * the necessary provisions and fuel for the use of the family for six months; the proper tools, instruments or books of the debtor. * * * *

* * * * * If a printer, a printing press and the contents thereof, not to exceed the value of twelve hundred dollars; poultry to the value of twenty dollars and if the debtor is a seamstress, one sewing machine. [25 G. A., ch. 95; 19 G. A., ch. 49; 19 G. A., ch. 62; § 1; 15 G. A., ch. 42; C. 3072; R., §§ 3304, 3305, 3308; C. '51, §§ 1898-9.]

C. 4011. *Personal earnings.*—The earnings of a debtor who is a resident of this state and the head of a family for his personal services, or those of his family, at any time within ninety days next preceding the levy, are exempt from liability of debt.

C. 4019. *Debts owing for labor preferred.*—When the property of any debtor, company, corporation, firm or person shall be seized upon by any process

of any court, or placed in the hands of a receiver, trustee or assignee for the purpose of paying or securing the payment of the debts of such corporation, firm or person, the debts owing to employes for labor performed within the ninety days next preceding the seizure or transfer of such property, to an amount not exceeding one hundred dollars to each employe, shall be a preferred debt and paid in full, or if there is not sufficient from such property to pay the same in full, then, after the payment of the same ratably out of the fund remaining, but such preference shall be junior and inferior to mechanics liens for labor in opening and developing coal lands. [23 G. A., chs. 47, 48.]

SEC. 5027. *Blacklisting employes.*—If any person, agent, company or corporation, after having discharged any employe from his or its service, shall prevent or attempt to prevent, by word or writing of any kind, any discharged employe from obtaining employment with any other company or corporation, except by furnishing in writing on request a truthful statement as to the cause of his discharge, such person, agent, company or corporation, shall be punished by a fine not exceeding five hundred dollars, or less than one hundred dollars; and shall be liable for all damages sustained by any such person. [22 G. A., ch. 57, § 1.]

SEC. 5028. *Blacklisting—same by agents.*—If any railway company, or other company, partnership or corporation shall authorize or allow any person or their agents to blacklist any discharged employe, or attempt by word or writing or any other means whatever to prevent such discharged employe or any employe who may have voluntarily left said company's service from obtaining employment with any other person or company, except as provided for in the preceding section, such company or copartnership shall be liable in treble damages to such employe so prevented from obtaining employment. [Same, § 2.]

SEC. 5040. *Breach of Sabbath.*—If any person be found on the first day of the week, commonly called Sunday, engaged in carrying fire-arms, dancing, hunting, shooting, horse racing, or in any manner disturbing the public worshiping assembly, or private family, or in buying or selling property of any kind, or in any labor except that of necessity or charity, he shall be fined not more than five nor less than one dollar, and be imprisoned in the county jail until the fine, with cost of prosecution, shall be paid; but the provisions herein contained shall be construed to extend to those who conscientiously observe the seventh day of the week as the Sabbath, or to prevent traveling or families emigrating from pursuing their journey, or keep tollbridges, tollgates and ferrymen from attending the same. [C. 4072; R., §§ 4392-3.]

SEC. 5049. *Falsely using label of labor union.*—Every person, association or union of working men or others that has adopted or shall adopt their protection any label, trade-mark, or form of advertisement, must deposit the same for record in the office of the secretary of state by leaving two copies, counterparts or facsimilies thereof with the secretary of state. The secretary shall thereupon deliver to such person, association or union the same a duly attested certificate of the record of the same, for which he shall receive a fee of one dollar. Such certificate of record shall in all cases be a sufficient proof in any and prosecutions under the following six sections be sufficient proof of the adoption of such label, trade-mark or form of advertisement, and the

d person, association or union to adopt the same. [24 G. A., Ch 36, 3.]

c. 5050. *Injunctions.*—Every person, association or union adopting a trade-mark or form of advertisement, as specified in the preceding section, may proceed by action to enjoin the manufacture, use, display or of any counterfeits or imitations thereof, and all courts having jurisdiction of such actions shall grant injunctions to restrain such manufacture, display or sale, and shall award the complainant therein such damages resulting from such wrongful manufacture, use, display or sale, and a reasonable attorney's fee to be fixed by the court, and shall require the defendant to pay to such person, association or union the profits derived from such manufacture, use, display or sale, and a reasonable attorney's fee to be fixed by the court, and said court shall also order that all such counterfeits or imitations in the possession or under the control of any defendant in such case be delivered to an officer of the court to be destroyed. Such person may be prosecuted for the benefit of any association or union by any officer or member thereof.

c. 5051. *Imitation of such label.*—It shall be unlawful for any person or corporation to imitate any label, trade-mark or form of advertisement as provided in the second preceding section, or to knowingly use any counterfeit or imitation thereof, or to use or display such genuine label, trade-mark or form of advertisement, or the name or seal of such person, association, or of any officer thereof, unless authorized so to do, or in any manner not authorized by him or it. Any person violating any provision of this section shall be imprisoned in the county jail not more than thirty days, or be fined not less than twenty-five nor more than one hundred dollars. [Same, §§ 1, 2, 5, 7.]

CHAPTER 21.

TWENTY-SEVENTH GENERAL ASSEMBLY—HOUSE FILE 178.

ACT to amend section seven hundred (700) of the code, relating to the power of cities to regulate, license and tax certain kinds of business.

Enacted by the General Assembly of the State of Iowa:

SECTION 1. *Engineers, examinations, licenses.*—That section 700 of the code be amended by striking out the period at the end of said section and inserting the following:

"and to provide for the examination and licensing engineers of stationary engines."

Approved March 8, 1898.

*CHAPTER 49.

TWENTY-SEVENTH GENERAL ASSEMBLY—SENATE FILE 53.

ACT to amend section number two thousand and seventy-one (2071), chapter five (5), title ten (X), of the Code, relating to liability for injuries to employees.

Enacted by the General Assembly of the State of Iowa:

For contracts not a bar or defense to cause of action.—That section num-

ber of amendment.

ber two thousand and seventy-one (2071) of the Code be amended adding to the end thereof the following:

"Nor shall any contract of insurance, relief, benefit, or indemnity of injury or death, entered into prior to the injury, between the person injured and such corporation, or any other person or association as such corporation, nor shall the acceptance of any such insurance, benefit, or indemnity, by the person injured, his widow, heirs, representatives, after the injury, from such corporation, person, or association, constitute any bar or defense to any cause of action brought under the provisions of this section, but nothing contained herein shall be construed to prevent or invalidate any settlement for damages between the person injured and such corporation, or any other person or association subsequent to injuries received."

Approved March 8, 1898.

CHAPTER 138.

TWENTY-EIGHTH GENERAL ASSEMBLY · SENATE FILE 7.

MANUFACTURE OF PEARL BUTTONS AND BUTTER TUBS IN THE STATE PENITENTIARY.

AN ACT to prohibit the manufacture of pearl buttons and butter tubs in the state penitentiary. (Amendatory of chapter 2, title XXV of the code, relating to the penitentiaries.)

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. *Manufacture prohibited.*—It shall not be lawful to make or complete existing contracts made by board of control to manufacture or sale any pearl buttons or butter tubs in the penitentiaries of this state. It shall be the duty of the board of control and wardens of said penitentiaries to enforce the provisions of this act and to prohibit the manufacture of pearl buttons or butter tubs in whole or in part, by the inmates confined in the penitentiaries.

SEC. 2. *Existing contracts.*—This act shall not alter or impair the validity of any contract actually made and entered into by and between a contractor and the board of control which shall have been made prior to the passage of this act.

SEC. 3. *In effect.*—This act being deemed of immediate importance shall take effect and be in force on and after its publication in the Iowa Register and the Des Moines Leader, newspapers published at Des Moines, Iowa.

Approved April 7, 1900.

The laws relating to mines, mining, and miners, have been issued in pamphlet form by the State Mine Inspectors, together with their report 1899 and 1900.

The several sections and titles are here repeated for reference:

SECTION 2478.—*Inspectors.*

SEC. 2479.—*Board of Examiners.*

SEC. 2480.—*Meetings, compensation.*

SEC. 2481.—*Examination, qualification of candidates.*

SEC. 2482.—*Inspection districts, powers and duties of inspector.*

SEC. 2483.—*General office, report to governor, compensation.*

- c. 2484.—*Removal of inspector.*
- c. 2485.—*Maps of mines, surveys, double damages.*
- c. 2486.—*Escape and air shafts.*
- c. 2487.—*Time for constructing outlets.*
- c. 2488.—*Ventilation.*
- c. 2489.—*Safety appliances, competent engineers, boys not employed.*
- c. 2490.—*Scales and weighers, records, payment in money.*
- c. 2491.—*Penalties.*
- c. 2492.—*Failure to provide for safety of employes.*
- c. 2493.—*Purity of oil.*
- c. 2494.—*Penalty.*
- c. 2495.—*Testing oil.*
- c. 2496.—*Provisions applicable.*

Laws of the Twenty-eighth General Assembly.

CHAPTER 79.

COMPENSATION OF MINE INSPECTORS.

Amended section 2483 of the code.

- SECTION 1.—*Salaries and allowance for expense increased.*

CHAPTER 80.

RELATING TO MINES AND MINERS'

- SECTION 1. *Slack Excluded.*—Amend section 2490 of the code.

CHAPTER 81.

PAYMENT OF COAL MINERS.

- SECTION 1. *Wages: how and when paid.*—Amend section 2490 of the code.

CHAPTER 82.

RELATING TO EXAMINATION OF MINE FOREMEN, PIT BOSSES, AND HOISTING ENGINEERS.

- SECTION 1. *Certificates of competency.*—Amend chapter 9, title 12, of the

- c. 2. *How procured.*
- c. 3. *Board of examiners to adopt rules; compensation.*
- c. 4. *Certificates of competency; how issued.*
- c. 5. *Fees; certificates recorded.*
- c. 6. *Penalty.*

TABLE OF CONTENTS

Letter of transmittal.....	3
Factory inspection.....	37
Manufacturing industries of Iowa.....	75
Wage-Earners of Iowa.....	112
Railroad statistics of Iowa (employees).....	139
Trade unions in Iowa.....	173
Co-operation and Profit sharing.....	207
Locations for new industries in Iowa.....	231
Manual training in Iowa.....	251
Strikes in Iowa.....	267
Lockouts in Iowa.....	337
The shorter work day in the United States.....	343
Cost of labor bureaus in the United States.....	359
Statutory investigation in Iowa.....	367
Introductory to the Manufacturing Statistics, by Dr. W. R. Patterson.....	481
The Value and Influence of Labor Statistics, by Carroll D. Wright, Commissioner United States department of labor.....	486
The Amana Society, the industrial history of, by Mrs. Bertha H. Shambaugh.....	498
The Kindergarten as an Educational Force, by Prof. Francis E. Cook.....	512
Manual Training vs. Trade Schools, by Dr. Caloni Milton Woodward.....	527
The Icarian Colony of Iowa.....	542
Free Employment Offices in the United States, by Miss Kate B. Miller.....	546
The Workings of the Department of Labor, by Carroll D. Wright, Commissioner United States department of labor.....	563
Labor laws of Iowa.....	583

INDEX.

A

PAGE

Abolition of statutory blanks	32
Acknowledgments	35
Advantages to labor without strikes	352
Amana Society	498
Annual expenses of labor bureaus in United States	34
Appropriation for Iowa Bureau of Labor Statistics	33
Attorney General, letters	6, 9

B

Belts and belting	17
Boilers, and inspection of	18, 19
Bureaus of labor, annual expenses of in United States	34
Bureaus of labor in United States, cost of	361
Table No. 1	362, 363
Comparative analysis of	364

C

Child labor	20
Comparative analysis of Labor Bureaus in United States	364
Convict labor	3
Wage-earners, remarks on and suggested control of	123
Cook, Francis E., Professor	5, 512
Co-operation	3, 209
Cost of Labor Bureaus in United States	361

D

Damage suits	20
Dangerous machinery	16

E

Eight hour day	3, 118, 119
120, 203, 205, 206, 228, 345, 348	
Elevator guards	16
Emery wheels	17
Engineers' examination	19
Expense of labor bureaus in U. S., annual	34

F

Factory inspection	3, 6, 58, 65
Table No. 1	38
Table No. 2	48
Fire escapes	15
Free employment offices in U. S.	5, 546

G

PAGE

Gearing, protection from	17
Grndstones	17
Guards for elevators	16
Gypsum industry in Iowa	31

H

Health, Iowa State Board of	12
Heating, need of in Iowa factories	13

I

Icarian colony of Iowa	5, 542
Influence of labor statistics	486
Industrial introductory	481
Industries in Iowa, location of new	29-233
Inspection of boilers	19
Insurance of boilers	18

K

Kindergartens	5, 512
Kennedy, Dr., letter on laws of health ..	12

L

Labor, advantages to, without strikes ...	352
Labor bureaus in United States, annual expense of	34
Labor bureaus in United States, cost of ..	361
Comparative analysis of	364
Labor of children	20
Labor laws of Iowa	585
Labor organizations of Iowa	3, 25, 175
Statistical tables—	
No. 1	180
No. 2	198
No. 3	200
No. 4	201
No. 5	202
Suggested legislation, by	203
Labor statistics, value of	486
Labor, working of the United States department of	563
Location of new industries	29, 233
Lockouts in Iowa	338
Summary of	342

M

Machinery, dangerous in Iowa factories ..	16
Manual training	3, 5, 253, 527

	PAGE
Manufactures of Iowa. Statistics.....	26
Table No. 1, Specified Industries...	76
Table No. 2, by counties	88
Table No. 3, by decades.....	100
Table No. 4, all establishments....	101
Table No. 5, ten leading industries	102
Table No. 6, urban manufactures..	104
Bulletin of manufactures	106
Miller, Miss Katie B.....	5, 546

N.

Narrative of factory inspections.....	66
Need of factory inspection.....	10
Necessity for stenographer....	33
New industries in Iowa Location of....	29, 233

P

Patterson, Dr. W. R.....	481
Profit sharing.....	3, 216

R

Railroad employes, protection to.....	19, 170
Railroad employes statistics.....	142
Recommendations by factory inspectors..	58
Remarks by railroad employes on safety and suggested legislation.....	170
Remarks by wage earners on convict labor.....	123
Remarks by wage earners and suggested legislation.....	117

S

Safety and sanitation for factories in Iowa.	58
Sanitary conditions of Iowa factories ..	11, 58
Set screws in Iowa factories.....	17
Shambaugh, Mrs. Bertha H.....	4, 498
Shorter work day in U. S.	345
Table No. 1.....	348
Special industries in Iowa.....	30
Statistics of labor, value of.....	486
Stenographer, necessity for.....	33

	PAGE
Strikes in Iowa.....	3, 29, 269
Statistical tables:	
No. 1.....	272
No. 2.....	326
No. 3.....	332
No. 4.....	334
Strike summaries.....	336
Statutory blank, abolition of.....	32
Statutory investigation by counties.....	368
Summary all counties.....	480
Sugar beet culture in Iowa.....	30
Suggested legislation by trade unions in Iowa.....	203
Suggested legislation by wage earners in Iowa.....	117
Sunday laws and observance.....	3, 117, 119, 157, 122, 203, 204, 206

T

Tow industry in Iowa.....	31
Trade unions in Iowa.....	3, 25, 175
Statistical tables, No. 1.....	180
No. 2.....	198
No. 3.....	200
No. 4.....	201
No. 5.....	202
Suggested legislation by.....	203
Trade union labels.....	347
Trade unions in United States.....	348
Traveling expenses for Bureau of Labor.	33

U.

Upholstery, tow industry.....	31
U. S. department of labor, workings of..	563

V.

Value of labor statistics.....	486
Ventilation of Iowa factories.....	13

W.

Wage earners, statistics of.....	3, 111
Table No. 1.....	128
Water closets in Iowa factories....	11
Wheels, emery.....	17
Workday shorter in U. S.....	345, 348
Working of U. S. department of labor...	563
Woodward, Caloni Milton Dr....	5, 527
Wright, Carroll D.....	5, 22, 23, 35, 486, 503

TENTH BIENNIAL REPORT

OF THE

STATE MINE INSPECTORS

TO THE

GOVERNOR OF THE STATE OF IOWA

FOR THE

TWO YEARS ENDING JUNE 30, 1901.

JAMES A. CAMPBELL, District No. 1; **JOHN VERNER**, District No. 2;
JAMES W. MILLER, District No. 3.

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

DES MOINES:
BERNARD MURPHY, STATE PRINTER.
1901.

BOARD OF EXAMINERS.

FLOYD DAVIS, *President*, Des Moines.

JAMES E. STOUT, *Secretary*, Des Moines.

ALEXANDER DARGAVELL, Centerville.

JOSEPH LEWIS, Hiteman.

JOHN OWENS, Beacon.

STATE INSPECTORS OF MINES.

JAMES A. CAMPBELL, *First District*, Ottumwa.

JOHN VERNER, *Second District*, Oskaloosa.

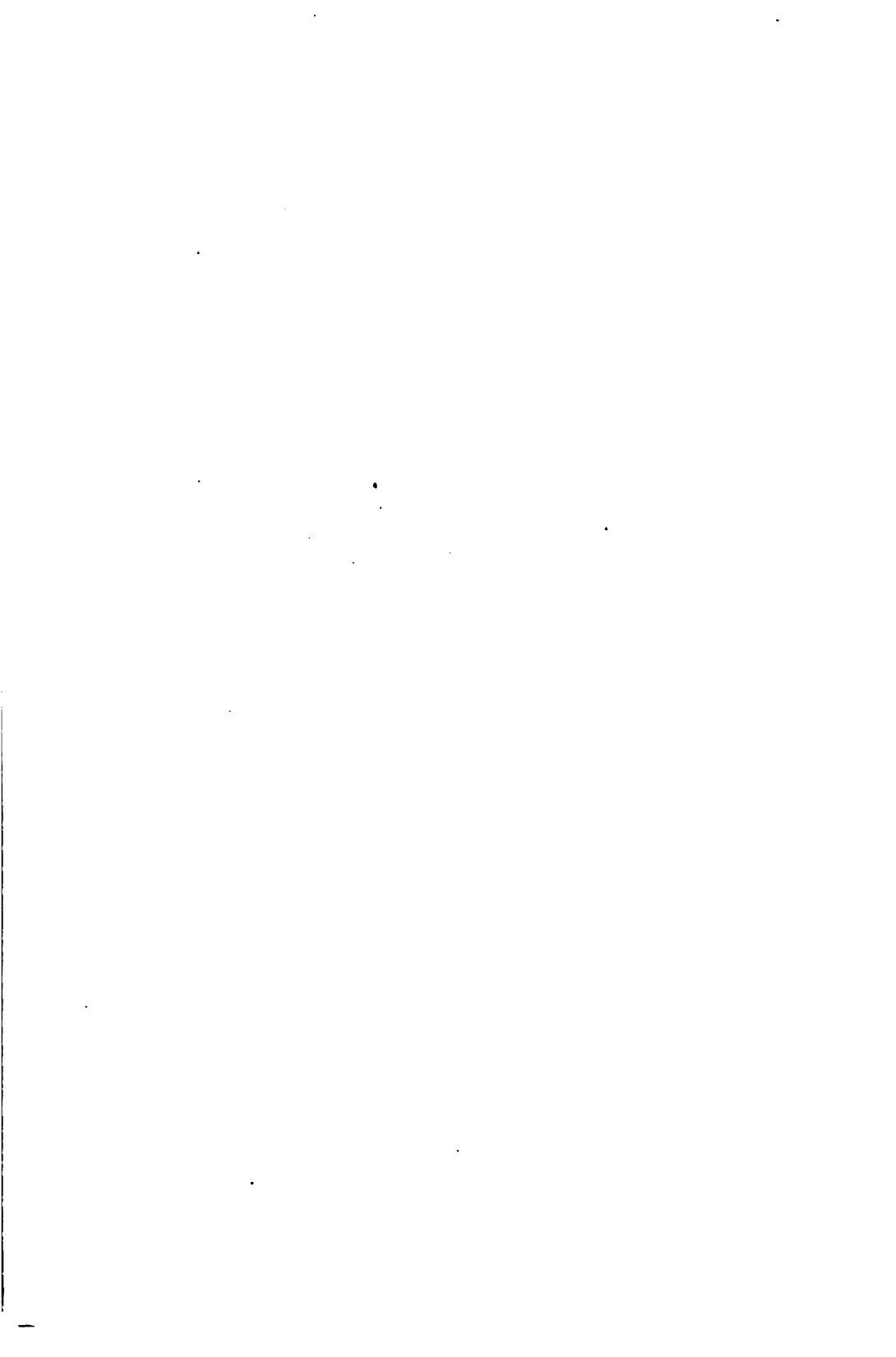
JAMES W. MILLER, *Third District*, Des Moines.

BIENNIAL REPORT
OF THE
FIRST DISTRICT,

EMBRACING

**Appanoose, Davis, Jefferson, Monroe, Page, Taylor, Van
Buren, Wapello and Wayne Counties.**

JAMES A. CAMPBELL, INSPECTOR.



LETTER OF TRANSMITTAL.

To the Hon. Leslie M. Shaw, Governor of Iowa:

SIR—I have the honor, in compliance with the mining laws of Iowa, to submit to you herewith my biennial report for the two years ending June 30, 1901.

In it will be found tabulated statements giving number of mines, and number of miners and other employees, also the amount paid the same, number of tons of coal produced, number of fatal and non-fatal accidents, number of new mines and abandoned mines, and all improvements made in the district, and other information I deemed of importance to incorporate.

Respectfully,

JAS. A. CAMPBELL.

REPORT OF FIRST DISTRICT.

In the First district there are nine coal producing counties, namely: Appanoose, Davis, Jefferson. Monroe, Page, Taylor, Van Buren, Wapello and Wayne. They are located in the southeastern, southern and south western part of the state. Van Buren and Jefferson counties on the east, and Page on the west, are the extremities of the district. The counties in this district producing the largest output of coal are Monroe, Appanoose, Wapello, and Wayne. The mines in general have been working more steadily than heretofore, giving employment to more men, owing to a greater demand for coal and the opening of new mines, which has placed the district in a prosperous condition.

In the last two years there have been eighteen fatal and thirty-four non-fatal accidents in the district.

There has been a number of drills prospecting in the different parts of the district for the last eighteen months.

During the last two years there have been twenty-seven new mines opened. Most all of them are equipped with the latest improvements for ventilating and handling the coal. The new mines are located as follows: Wapello Coal Co. No. 3, near Hiteman; Consolidated Coal Co. Nos. 10 and 11, two and one-half and three miles southwest of Buxton; Smoky Hollow Coal Co. No. 6, five miles southeast of Hynes City; Hocking Coal Co. No. 2, near Hocking; St. Paul Coal Co., near Hilton; Frederick Coal Co., near Avery; White Ash Coal Co., near Hynes City; Star Coal Co. No. 2, near Albia; Thistle Coal Co. No. 2, two miles east of Cincinnati; Artic Coal Co., near Mystic; Columbia Coal Co. No. 3, near Diamond P. O.; Browning Coal Co. No. 2, New Market; Ingram Coal Co., two and one-half miles southwest of Clarinda; Anderson Coal Co. No. 2, two and one-half miles east of New Market; Chicago Coal Co., No. 2, two miles east of Seymour; Bear Creek Coal Co., four miles east of Ottumwa; Eldon Coal and Coke Co., two miles southwest of Eldon; Lunsford Coal Co., eight miles south of Bloomfield; Finley Coal Co. and Carson Coal Co., near Douds; Perlee Coal Co., near Perlee; Drake Coal Co., three miles east of Exline; Mystic Coal Co. No. 2, Mystic.

Five mines were abandoned—Smoky Hollow Coal Co. No. 5, near Hynes City; Browning Coal Co. No. 1, near New Market; Darby Block Coal Co., near Darbyville; Finley Coal Co. and Carson Coal Co., near Douds.

Fires have occurred at five different mines, as follows: The Appanoose Coal Co.'s top plant, at Cincinnati; Consumers' Coal Co., top works, at Jerome; a part of the top works of the Merchants' Coal Co. mine at Cincinnati; the smokestack and timber in airshaft all burned at Centerville Block

Coal Co's. mine No. 5, at Brazil; and the Machine and Blacksmith shops at the Deep Vein Coal Co's. mine at Foster.

During the last two years there have been forty-eight sets of scales inspected. Thirty-one were found weighing correctly, and seventeen were found deficient. They were adjusted and made to weigh correctly, giving satisfaction to all concerned.

TABLE No. 1.

Showing the number of mines, out-put of coal, number of miners and other employes, etc., in District No. 1, for the year ending June 30, 1900.

NAME OF COUNTY.	Number of miners.	Number of tons of coal all grades produced.	Number of miners employed.	Number others employed.	Total amount paid miners, including yardage room turning, etc.	Total amount paid others, including cost of supervision.	Value props, lumber, tracking, etc.	Cost of improvements made during year, including air and escape shafts.	Average price paid for mining lump coal.	Average price paid for mining mine run coal.
Appanoose.....	76	645,403	1,833	585	\$ 568,283	\$ 182,114	\$ 46,656	\$ 19,312	.85	.75
Monroe.....	18	641,928	1,148	516	392,984	236,351	34,550	22,952	.80	.51%
Wapello.....	20	206,620	483	186	197,389	76,609	14,775	6,700	.80	.52
Wayne.....	6	48,800	125	31	35,480	11,800	1,550	700	.85	.....
Taylor.....	7	22,682	81	24	27,485	8,805	920	2,169	1.20	.....
Van Buren.....	4	13,368	30	13	10,720	5,446	850	525	.80	.....
Davis.....	5	5,750	40	15	4,600	1,600	350	200	.80	.....
Jefferson.....	3	4,500	22	6	3,600	1,640	300	100	.80	.....
Total.....	139	\$ 1,679,051	3,762	1,406	\$ 1,240,481	\$ 524,515	\$ 97,960	\$ 52,658	...	.....

TABLE No. 2.

Showing the number of mines, out put of coal, number of miners and other employes, etc., in District No. 1, for the year ending June 30, 1901.

NAME OF COUNTY.	Number of miners.	Number of tons of coal all grades produced.	Number of miners employed.	Number others employed.	Total amount paid miners, including yardage room turning, etc.	Total amount paid others including cost of supervision.	Value props, lumber, tracking, etc.	Cost of improvements made during year, including air and escape shafts.	Average price paid for mining lump coal.	Average price paid for mining mine run coal.
Appanoose.....	73	650,400	1,790	530	\$ 677,300	\$ 195,500	\$ 51,700	\$ 22,500	.85	.....
Monroe.....	19	937,750	1,330	618	672,570	273,255	68,300	71,400	.85	.....
Wapello.....	18	280,300	490	160	224,400	87,540	12,000	2,500	.85	.....
Wayne.....	6	50,200	137	40	53,440	15,430	16,000	800	.85	.....
Taylor.....	7	20,400	90	24	31,740	8,500	900	400	1.20	.....
Van Buren.....	6	6,500	26	9	7,300	2,900	200	150	.80	.....
Davis.....	4	4,300	21	7	5,850	1,750	150	75	.80	.....
Jefferson.....	3	3,500	17	6	4,730	1,840	150	150	.80	.....
Paga.....	2	1,700	5	2	2,100	900	50	50	1.35	.....
Total.....	138	\$ 1,964,050	3,906	1,396	\$ 1,679,430	\$ 587,675	\$ 149,450	\$ 98,025	.....	.....

TABLE No. 3.

Out-put of coal of the counties comprising District No. 1 for the past five years:

COUNTIES.	1897.	1898.	1899.	1900.	1901.
Appanoose.....	372,402	421,100	444,282	645,403	650,400
Davis.....	3,120	2,900	3,300	5,750	4,300
Jefferson.....	5,000	4,000	4,500	4,500	3,500
Monroe.....	389,706	590,300	662,500	641,928	937,750
Page.....	7,250	5,050	6,085	.....	1,700
Taylor.....	13,200	11,800	14,100	22,682	20,400
Van Buren.....	14,300	11,200	12,500	13,368	6,500
Wapello.....	152,203	236,100	291,300	290,620	289,100
Wayne.....	32,120	41,200	48,300	48,800	50,200

APPANOOSE COUNTY.

Improvements made in the mines during the last two years.

NAME OF MINE.	Air shaft.	Second opening.	Stairway.	Cover on cage.	Safety catches.	Safety gates.	Break on drum.	Fan.	Furnace.	Trallor or dog.	Safety block.
Centerville, block No. 7.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Centerville, block No. 5.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Mystic Coal company.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Hocking Coal company.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Drake Coal company.....	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....
Dewey Coal company.....	1	1	1	2	2	2	1	1	.....	.....	.....
Juckett Coal company.....	1	.....	.....	.....	.....	1	1	1	.....	.....	.....
Mendota Coal and Mining company.....	1	.....	1	2	2	2	1	1	.....	.....	.....

MONROE COUNTY.

Wapello Coal company, No. 1.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Wapello Coal company, No. 3.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Consolidation Coal company, No. 10.....	1	1	1	2	2	4	1	1	.....	.....	.....
Consolidation Coal company, No. 11.....	1	1	1	2	2	4	1	1	.....	.....	.....
Hocking Coal company No. 2.....	1	1	1	2	2	4	1	1	.....	.....	.....
St. Paul Coal company.....	1	1	.....	2	2	4	1	1	.....	.....	.....
Smoky Hollow, No. 6.....	1	1	1	.....	.....	.....	1	.....	1	1	.....
Rex Coal company.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fredrick Coal company.....	1	1	.....	2	1	2	1	1	.....	.....	.....
Deep Vein Coal company.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....
Star Coal company, No. 2.....	.....	1	.....	2	2	2	1	1	.....	.....	.....

PAGE COUNTY.

Ingram Coal company.....	1	1	1	1	2	1
--------------------------	---	---	-------	---	---	---	-------	-------	---	-------	-------

WAPLLO COUNTY.

Bear Creek Coal company.....	1	1	.....	.....	.....	.....	.....	1	1	1	.....
Fair Coal company.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
Risher Coal company.....	1	.....	2	2	4	1	1	.....	.....	.....	.....
Eldon C. and M. company.....	1	.....	.....	.....	.....	.....	.....	.....	1	1	1
Eldon Coal and Coke company.....	1	.....	.....	.....	.....	.....	.....	.....	1	1	1

TAYLOR COUNTY.

Anderson Coal company.....	.....	1	.....	2	2	2	1	.....	1	.....	.....
Browning Coal company.....	.....	.....	.....	1	1	2	1	.....	1	.....	.....

AMOUNT OF COAL MINED IN IOWA SINCE 1881.

YEARS.	District No. 1.	District No. 2.	District No. 3.	Totals.
1881.....	845,600	1,426,744	900,430	3,262,774
1882.....	940,000	1,258,146	1,010,000	3,208,146
1883.....	1,009,503	1,470,024	1,413,419	3,892,946
1884.....	1,040,895	1,413,811	1,447,585	3,902,291
1885.....	1,156,224	1,231,963	1,194,469	3,582,656
1886.....	1,264,433	1,488,200	900,741	3,653,374
1887.....	1,426,841	1,645,978	791,671	3,864,490
1888.....	1,528,967	1,663,206	931,727	4,123,900
1889.....	1,395,156	1,461,518	806,064	3,662,738
1890.....	1,314,767	1,408,950	1,066,787	3,790,504
1891.....	1,136,190	1,533,496	1,051,205	3,720,881
1892.....	1,280,860	1,695,735	970,884	4,047,479
1893.....	1,697,215	1,764,800	1,132,857	4,614,872
1894.....	1,397,631	1,462,626	16,434	3,776,691
1895.....	994,054	1,347,830	853,952	3,195,836
1896.....	989,768	1,476,700	1,059,022	3,525,490
1897.....	1,025,706	1,572,240	1,201,788	3,799,734
1898.....	1,354,350	1,672,913	1,370,459	4,142,222
1899.....	1,520,467	1,873,793	1,555,050	4,949,304
1900.....	1,679,050	1,930,214	1,508,020	5,117,284
1901.....	1,964,050	1,870,123	1,607,690	5,441,863

APPANOOSE COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Centerville Block Coal Co., No. 1.....	Alex. Dargaveil.....	Centerville.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.....
Centerville Block Coal Co., No. 2.....	Alex. Dargaveil.....	Centerville.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.....
Centerville Block Coal Co., No. 3.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Room and pillar.....	Fan.....	Steam.....	Shipping.....
Centerville Block Coal Co., No. 4.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Steam.....	Shipping.....
Centerville Block Coal Co., No. 5.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Steam.....	Shipping.....
Centerville Block Coal Co., No. 6.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Centerville Block Coal Co., No. 7.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Centerville Block Coal Co., No. 8.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Centerville Block Coal Co., No. 9.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Centerville Block Coal Co., No. 10.....	Alex. Dargaveil.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Mendota Coal and Mining Co., No. 1.....	B. H. Johnson.....	Centerville.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.....
Mendota Coal and Mining Co., No. 2.....	B. H. Johnson.....	Mendota, Mo.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.....
Anchor Coal Co., No. 1.....	James Wilson.....	Mendota, Mo.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Anchor Coal Co., No. 2.....	James Wilson.....	Centerville.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Anchor Coal Co., No. 3.....	James Wilson.....	Centerville.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Whitebreast Fuel Co., No. 19.....	T. J. Phillips.....	Centerville.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Numa Coal Co., No. 1.....	Geo. Widmer.....	Ottumwa.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Star Coal Co., No. 1.....	Geo. McCleary.....	Rathbun.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Scandinavian Coal Co., No. 1.....	Claus Johnson.....	Centerville.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Consumers Coal Co., No. 1.....	F. R. Gable.....	Centerville.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Big Joe Coal Co., No. 1.....	Robt. Hunter.....	Cedar Rapids.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Big Joe Coal Co., No. 2.....	Robt. Hunter.....	Coal City, Ill.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Tipton Co-operative Coal Co., No. 1.....	A. W. Buel.....	Coal City, Ill.....	Slope.....	Long wall.....	Furnace.....	Steam.....	Shipping.....
Iowa and Missouri Coal Co., No. 1.....	Jas. Seddon.....	Brazil.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Brazil Coal Co., No. 1.....	B. F. Silknetter.....	Brazil.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Columbia Coal Co., No. 1.....	Wm. Baker.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Columbia Coal Co., No. 2.....	Wm. Baker.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Electric Coal Co., No. 1.....	Thos. E. Lee.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Electric.....	Shipping.....
Electric Coal Co., No. 2.....	Thos. E. Lee.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Electric Coal Co., No. 3.....	Thos. E. Lee.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Electric Coal Co., No. 4.....	Thos. E. Lee.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Electric Coal Co., No. 5.....	Thos. E. Lee.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Electric Coal Co., No. 6.....	Thos. E. Lee.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Phoenix Coal Co., No. 1.....	Jas. Turner.....	Centerville.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Thistle Coal Co., No. 1.....	David Steel.....	Brazil.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Thistle Coal Co., No. 2.....	David Steel.....	Cincinnati.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Eagle Coal Co., No. 1.....	Smith.....	Cincinnati.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Eagle Coal Co., No. 2.....	Smith.....	Cincinnati.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Shipping.....

Merchants Coal Co. No. 1	D. Collins	Cincinnati	Shaft	Long wall	Furnace	Steam	Shipping
Hocking Coal Co. No. 1	Robt. Hughes	Cincinnati	Shaft	Long wall	Furnace	Horse	Shipping
Ludwick Coal Co. No. 1	David Ludwick	Mystic	Shaft	Long wall	Furnace	Horse	Shipping
Mystic Coal Co. No. 1	Geo. Helm	Mystic	Shaft	Long wall	Furnace	Horse	Shipping
Klondike Coal Co. No. 1	Geo. Helm	Mystic	Shaft	Long wall	Furnace	Horse	Shipping
Achon Coal Co. No. 1	Wm. Porter	Mystic	Shaft	Long wall	Furnace	Steam	Shipping
Achon Coal Co. No. 2	Wm. Porter	Mystic	Shaft	Long wall	Furnace	Horse	Shipping
Egypt Coal Co.	A. V. Vencell	Mystic	Shaft	Long wall	Furnace	Steam	Shipping
Lake Coal Co.	Daniel Clark	Brazil	Shaft	Long wall	Furnace	Horse	Shipping
Luckett Coal Co.	Juo Armstrong	Mystic	Shaft	Room and pillar	Furnace	Steam	Shipping
Orv Bros Coal Co. No. 2	A. Orr	Centerville	Shaft	Long wall	Furnace	Horse	Shipping
C. L. Arnot	C. L. Bowen	Mystic	Shaft	Long wall	Furnace	Steam	Shipping
Dewey Coal Co.	Oscar Johnson	Centerville	Shaft	Long wall	Furnace	Horse	Shipping
Seacock Coal Co.	Thos. Filby	Brazil	Shaft	Long wall	Furnace	Horse	Shipping
Star Coal Co.	J. G. Bland	Centerville	Shaft	Long wall	Furnace	Horse	Shipping
Monitor Coal Co.	A. D. Crawford	Centerville	Shaft	Long wall	Furnace	Local	Local
White Oak Coal Co.	Geo. Burkland	Centerville	Shaft	Long wall	Furnace	Horse	Local
Happy Coal Co.	Chas. Erickson	Centerville	Shaft	Long wall	Furnace	Horse	Local
North Hill Coal Co.	L. S. Hall	Centerville	Shaft	Long wall	Furnace	Horse	Local
Rock Valley Coal Co.	Wm. Fox	Centerville	Shaft	Long wall	Furnace	Horse	Local
Fox Coal Co.	Richard Campbell	Brazil	Shaft	Long wall	Furnace	Horse	Local
Richard Campbell	Richard Campbell	Brazil	Shaft	Long wall	Furnace	Horse	Shipping
Dickson Coal Co. No. 1	Jno. Dickson	Dean	Shaft	Long wall	Furnace	Horse	Shipping
Dickson Coal Co. No. 2	Jno. Dickson	Dean	Shaft	Long wall	Furnace	Horse	Shipping
Sam Houser	Sam Houser	Jerome	Shaft	Long wall	Furnace	Horse	Local
Gas Broser	Gas Broser	Jerome	Shaft	Long wall	Furnace	Horse	Local
Dean & McFall	Wm. McFall	Jerome	Shaft	Long wall	Furnace	Horse	Local
Aston Lee Coal Co.	Aston Lee	Mystic	Shaft	Long wall	Furnace	Horse	Local
Peter Anderson	Peter Anderson	Mystic	Shaft	Long wall	Furnace	Horse	Local
Ben Morris	Ben Morris	Mystic	Shaft	Long wall	Furnace	Horse	Local
Ira Grim	Ira Grim	Dean	Shaft	Long wall	Furnace	Horse	Local
Joseph Guim	Geo. Guim	Dean	Shaft	Long wall	Furnace	Horse	Local
Allen Coal Co. No. 1	Geo. Allen	Dean	Shaft	Long wall	Furnace	Horse	Local
Allen Coal Co. No. 2	Geo. Allen	Dean	Shaft	Long wall	Furnace	Horse	Local
Geo. Young	Geo. Young	Dean	Shaft	Long wall	Furnace	Horse	Local
McClelland Coal Co.	Jno. Oughton	Exline	Shaft	Long wall	Furnace	Horse	Local
Drake Coal Co.	J. Drake	Exline	Shaft	Long wall	Furnace	Steam	Shipping

MONROE COUNTY.

Wapello Coal Co. No. 1	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping
Wapello Coal Co. No. 2	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping
Wapello Coal Co. No. 3	P. H. Waterman	Hiteman	Shaft	Room and pillar	Fan	Steam	Shipping
Hocking Coal Co. No. 1	Jno. Schuller	Hocking Valley	Shaft	Room and pillar	Fan	Steam	Shipping

MONROE COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or slope.	PLAN OF WORK-ING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Hocking Coal Co. No. 2.	Ino Schnler.	Hocking Valley	Shaft.	Room and pillar.	Fan	Steam	Shipping.
Smoky Hollow Coal Co. No. 4.	E. Hines.	Hines City.	Slope	Room and pillar.	Fan	Steam	Shipping.
Smoky Hollow Coal Co. No. 5.	E. Hines.	Hines City.	Slope	Room and pillar.	Fan	Steam	Shipping.
Smoky Hollow Coal Co. No. 6.	E. Hines.	Hines City.	Slope	Room and pillar.	Fan	Steam	Shipping.
Consolidation Coal Co. No. 10.	B. C. Buxton	Muchaknock.	Shaft.	Room and pillar.	Fan	Steam	Shipping.
Consolidation Coal Co. No. 11.	B. C. Buxton	Muchaknock.	Shaft.	Room and pillar.	Fan	Steam	Shipping.
St. Paul Coal Co.	T. J. Phillips	Ottumwa	Shaft.	Room and pillar.	Fan	Steam	Shipping.
Central Coal Co.	Geo. Young	Hickory	Slope	Room and pillar.	Furnace	Steam	Shipping.
Diamond Coal Co. No. 1.	A. B. Little	Coalfield	Slope	Room and pillar.	Fan	Steam	Shipping.
Deep Ven Coal Co. No. 1.	A. E. Lin	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Sar Coal Co.	N. A. Flanders	Albia	Shaft	Room and pillar.	Fan	Steam	Shipping.
Deep Ven Coal Co. No. 2.	A. Erskin	Ottumwa	Shaft	Long wall	Fan	Horse	Shipping.
Redrick Coal Co.	Joe Scavenger.	Avery	Shaft	Room and pillar.	Fan	Steam	Shipping.
White Ash Coal Co.	Joe Smith	Avery	Slope	Room and pillar.	Furnace	Horse	Shipping.

WAPELLO COUNTY.

Whitebrest Fuel Co., No. 22.	Wm. Williams.	Ottumwa	Shaft.	Room and pillar.	Fan	Steam	Shipping.
Phillips Fuel Co., No. 4.	A. Erskins	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Lunsden Coal Co., No. 3.	D. L. Lunsden	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Eldon Coal and Mining Co	W. R. Daum	Ottumwa	Shaft	Room and pillar.	Fan	Steam	Shipping.
Carbon Coal Co.	L. Ludwick	Willard	Slope	Room and pillar.	Furnace	Horse	Shipping.
Bear Creek Coal Co.	Robt. Parker.	Ottumwa	Slope	Room and pillar.	Furnace	Horse	Shipping.
S. Ottumwa C. and M. Co.	Ino Jones.	Ottumwa	Slope	Room and pillar.	Fan	Steam	Local.
Sar Coal Co.	Robt. Pettit	Ottumwa	Slope	Room and pillar.	Fan	Steam	Local.
Baker Coal Co.	L. Brown	Ottumwa	Shaft.	Room and pillar.	Fan	Steam	Local.
Adams Coal Co.	A. P. Adams.	Ottumwa	Shaft.	Room and pillar.	Furnace	Horse	Local.
Spring Valley Coal Co	Chas. Olsson.	Ottumwa	Slope	Room and pillar.	Furnace	Horse	Local.
Wasson Coal Co.	E. O. Chapman	Ottumwa	Slope	Room and pillar.	Furnace	Horse	Local.
Black Hawk Coal Co.	E. Stire	Ottumwa	Slope	Room and pillar.	Furnace	Horse	Local.
Kisher Coal Co.	A. C. Caughlin	Ottumwa	Slope	Room and pillar.	Furnace	Horse	Local.
Fair Coal Co.	R. Kisher.	Ottumwa	Shaft.	Room and pillar.	Furnace	Horse	Local.
Fair Coal Co.	E. Fair.	Ottumwa	Slope	Room and pillar.	Furnace	Horse	Local.
Cooper Coal Co., No. 1.	Wm. Cooper.	Ottumwa	Slope	Room and pillar.	Grate	Horse.	Local.

VAN BUREN COUNTY.

Findley Bros.....	H. Findley.....	Douls.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Shipping.....
W. R. Carson.....	W. R. Carson.....	Douls.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Shipping.....
Radcliff Coal Co.....	H. L. Radcliff.....	Douls.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Shipping.....
Cahill Coal Co.....	C. A. Cahill.....	Farmington.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Local.....

JEFFERSON COUNTY.

Pearlee Coal Co.....	J. E. Courtney.....	Pearlee.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Shipping.....
Wilcox Coal Co.....	Wm. Wilcox.....	Fairfield.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Local.....
Bates Coal Co.....	G. W. Bates.....	Fairfield.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Local.....

WAYNE COUNTY.

Chicago Coal Co., No. 1.....	Peter Thomas.....	Seymour.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Chicago Coal Co., No. 2.....	Peter Thomas.....	Seymour.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Shipping.....
Seymour Coal Co.....	Geo. L. Moore.....	Seymour.....	Shaft.....	Long wall.....	Fan.....	Steam.....	Local.....
Lewis Fry.....	Lewis Fry.....	Confidence.....	Shaft.....	Long wall.....	Fan.....	Horse.....	Local.....
Will L. Roussan.....	W. L. Roussan.....	Confidence.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Local.....
Aaron Radcliff.....	Aaron Radcliff.....	Confidence.....	Slope.....	Long wall.....	Furnace.....	Horse.....	Local.....

DAVIS COUNTY.

Lunsford Coal Co.....	A. C. Lunsford.....	Lunsford.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Local.....
Thomas Dial.....	Thomas Dial.....	Ladysdale.....	Slope.....	Room and pillar.....	Furnace.....	Horse.....	Local.....
Geo. Jordan.....	Geo. Jordan.....	Eldon.....	Slope.....	Room and pillar.....	Furnace.....	Horse.....	Local.....
G. W. Dye.....	G. W. Dye.....	Eldon.....	Slope.....	Room and pillar.....	Furnace.....	Horse.....	Local.....
J. Teesdale.....	J. Teesdale.....	Eldon.....	Slope.....	Room and pillar.....	Furnace.....	Horse.....	Local.....

TAYLOR COUNTY.

Campbell Coal Co.....	Rodrick Campbell.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Anderson Coal Co., No. 1.....	Thos. Anderson.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Shipping.....
Anderson Coal Co., No. 2.....	Thos. Anderson.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Shipping.....

TAYLOR COUNTY—CONTINUED.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Browning Coal Co.....	Wm. Browning.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Shipping.
Wilcox Coal Co.....	Wm. Wilcox.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.
Geo. Walsh mine.....	Geo. Walsh.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.
James Jamison mine.....	James Jamison.....	New Market.....	Shaft.....	Long wall.....	Furnace.....	Horse.....	Local.
PAGE COUNTY.							
Ingram Coal Co.....	J. Ingram.....	Clarinda.....	Shaft..	Long wall.....	Furnace.....	Horse.....	Local.
George Howard.....	George Howard.....	Shambough.....	Shaft..	Long wall.....	Furnace.....	Horse.....	Local.

APPANOOSE COUNTY.

This county is underlaid with a very regular vein of coal; having double amount of mines that any other county in the state has. The principal mining centers are Centerville and Mystic, there being more mines located in a radius of six miles of these points than in any other location in the state. The coal is worked on long wall and semi-long wall method. The coal is of an excellent quality, and one among the best domestic coals produced.

There were employed in the mines on an average, during the past biennial period, 1,809 miners and 545 day men, making, all told, employed in mines, 2,354 men and boys, who produced, during the past two years, 5,800 tons of coal, receiving in wages, during the above period, \$772,800, being an average for each employee working in and around the mines of \$1.33; this certainly is a good showing, taking into consideration the large number of mines that do very little work during the summer months.

There has been a great deal of improving going on in and around the mines, during the two years just passed; hoisting appliances, cages, triples, and a number of improvements which have materially aided those connected with the coal business in the above county.

The county is favored with good railway facilities, having the Iowa Central, K. and W., C., St. P. and M., C. R. and P., and K. C. Railways, to carry her product to the northern, northwestern, and western markets.

MONROE COUNTY.

Monroe county has become the largest coal-producer in the first district, and promises to be the largest in the state, having within the past biennial period added several large mining plants and increased the output of a great many of the others. The county's location for railway facilities and railway business is second to none in the state.

The new mining plants, as well as the older ones, are equipped with the latest mining improved machinery and equipments. The vein of coal is of excellent quality and thickness, and the vast amount of drilling that has been done clearly shows the county to contain some of the largest basins of coal discovered within this section. This territory is practically open to invasion from northern feeders, and this naturally leads to the more rapid development of these rich fields.

There was produced during the first year of our biennial period, 642,000 tons of coal; during the last half of our biennial there was produced 938,000 tons, nearly reaching the million point; being a net gain in favor of the last year of 295,822 tons, which is much the largest gain that was ever made in

any one county in a year during the history of mining in Iowa. Production of this coal gave employment to 1,235 miners and 590 day men, making of 1,825 employees working in and around the mines. There was during the last two years for wages 1,574,865 dollars; showing that this county is nearing the top of the column of mining counties.

WAPELLO COUNTY.

This county has quite a large field of coal, although the mines have not been mined in large quantities for a number of years. The coal is of good quality, giving excellent satisfaction as a stone coal. The veins average from three to five and one-half feet in thickness. There is a strong belief among the coal men that the largest basins of coal are, as yet, undeveloped, although there is a great deal of drilling being continued along the lines, which certainly means new developments. The local mines, within a radius of three miles of Ottumwa, do an excellent local business, owing to the large demand from manufacturing plants located around the city. The mines are increasing in number very rapidly.

JEFFERSON COUNTY.

Jefferson county has produced coal, in small quantities, for a number of years, but the production for each has never been large. Coal averages about three and one-half to four feet in thickness and usually free from impurities. Coal brings very good prices at the local mines, which are worked principally during the winter months. Ventilation is furnished by a furnace.

VAN BUREN COUNTY.

The coal-producing area of this county is small, none of the mines having direct railway connections. The coal is usually reached by shaft. Nearly all the mines now working are within a radius of three miles of Doud station. At most of the mines the miner delivers his coal on the cage.

Furnace ventilation prevails throughout the county. There are employed in and around the mines about fifty employees.

DAVIS COUNTY.

Davis county joins on the east one of the largest coal producing counties in the state, the same being Appanoose county. Yet, the county seems to increase its output of coal to a very large extent. This needs more prospecting, which if followed up will mean more machinery for handling coal. The county is favored with good facilities. The mines that are now being operated are within a short distance of Eldon.

WAYNE, TAYLOR, AND PAGE COUNTIES.

Wayne, Taylor, and Page counties compose the principal southern tier coal-producing counties, also a part of the line which divides Iowa and Missouri.

The principal coal seam worked in the above counties lies at considerable depth. The seam is of uniform thickness and a number one quality. The Chicago Coal Company, the C., R. I. & P., and the C., B. & Q. handle the coal from the various mines in these counties.

A large number of mines are operated exclusively for local business in various parts of the counties. They are usually located where it requires great expense to reach the coal and handle the same. Prices for mining coal in Taylor county average \$1.20 per ton; in Wayne county 95c is paid; in Page county \$1.00 per ton is paid. The long-wall method is used throughout the counties. Wayne county produced during the last biennial period 99,000 tons of coal, giving employment to 138 miners and 39 day men, making a total of 167 employes. There was paid out, during the biennial period for coal, \$116,200. Taylor county produced, during the same period, 43,080 tons, giving employment to on an average of 120 men, in and around the mines, and paid for wages, during the biennial period, \$73,530.

The ventilation of some parts of the mines located in the above named counties, has, at times been deficient, especially during the spring and fall months, for the reason that there are those who use furnace ventilation and depend on different ones in the mine to look after the furnace; there being sufficient output to enable them to employ one to do nothing else but look after the furnace; and for this reason the ventilation is very often neglected. Fans are being substituted in a number of places, which all tend to aid this section in better ventilation.

The companies producing the largest output of coal are the Chicago Coal Company, Nos. 1 and 2, and the Seymour Coal Company, each plant being located near Seymour.

There are in operation six mines in Wayne county, seven in Taylor county, and two in Page county, making a total of fifteen mines in the three counties.

FATAL ACCIDENTS.

Table showing Fatal Accidents in District No. 1, for the biennial period ending June 30, 1901.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
July 14, 1899	Alfred Swinscoe	Pit Boss	Struck by balance weight.	Black Hawk	Ottumwa.
October 27, 1899	J. L. Woods	Cager	Something fell from top of shaft and struck him	Chicago Coal Co.	Seymour.
November 3, 1899	I. McKinzie	Cager	Fell down shaft	Whitebreast Fuel Co.	Cleveland.
January 10, 1900	L. Edwards	Miner	Fall of slate	Wapello Coal Co.	Hileman.
March 1, 1900	Wm. Browning	Cager	Fell down shaft	Browning Coal Co.	New Market
March 19, 1900	Carter Perkins	Miner	Fall of slate	Hocking Coal Co.	Hocking Valley.
March 22, 1900	Geo. Hein	Miner	Fall of slate	Star Coal Co.	Ottumwa.
March 27, 1900	Chas. Carlson	Miner	Fall of slate	Diamond Coal Co.	Coalfield.
March 28, 1900	Wm. M. Allison	Driver	Fall of slate	Chicago Coal Co.	Hileman.
May 24, 1900	Harry Richards	Miner	Fall of slate	Mine No. 2	Seymour.
June 28, 1900	Harry Runyon	Cager	Something fell from top of shaft and struck him	Phillips Mine.	Hileman.
August 6, 1900	Robt. Evans	Miner	Fall of slate	Keb Mines	Ottumwa.
September 27, 1900	Frank Shirck	Miner	Fall of slate	Keb Mines	Keb.
January 16, 1901	Chas. Thornton	Miner	Fall of coal	Centerville Block No. 5	Brazil.
January 5, 1901	G. Williams	Miner	Fall of slate	Deep Velm	Poster.
June 5, 1901	G. C. Rains	Miner	Fall of slate	Wapello Coal Co.	Hileman.
February 28, 1901		Miner	Fall of slate	Anderson Mine.	New Market

STATE MINE INSPECTORS.

23

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
August 11, 1899	Frank E. Jane	Machine runner.	Back injured.	Fall of slate.	Centerville.
August 25, 1899	R. L. Evans	Timberman.	Hip and back injured.	Fall of slate.	Hocking.
September 28, 1899	Geo. Martin	Miner.	Back injured.	Fall of slate.	Avery.
October 9, 1899	Mack Wallace	Miner.	Leg broken.	Fall of slate.	Centerville.
October 27, 1899	Wm. Veatch	Machine runner.	Back broken.	Fall of slate.	Centerville.
November 5, 1899	H. Mathews	Miner.	Fracture of skull.	Fall of slate.	Mystic.
November 27, 1899	Geo. Palmer	Miner.	Legs bruised.	Shot of coal.	Avery.
December 12, 1899	R. Beknapp	Miner.	Leg broken.	Fall of slate.	Mystic.
January 10, 1900	Wm. Milligan	Miner.	Back and head injured.	Fall of slate.	Hynes.
February 8, 1900	A. Zanning	Miner.	Leg broken.	Foot caught in cage.	Kathbun.
March 16, 1900	Wm. Mathews	Miner.	Head and face burned.	Powder exploded.	Smoky Hollow.
March 22, 1900	J. B. James	Miner.	Head and body burned.	Powder exploded.	Smoky Hollow.
March 28, 1900	J. Cudworth	Loader.	Leg injured.	Fall of slate.	Laddsdale.
May 1, 1900	T. Semansky	Machine runner.	Lip and nose cut.	Struck by chain.	Laddsdale.
June 18, 1900	W. Anderson	Miner.	Bruised and stunned.	Hit by blown open door.	Hynes.
June 25, 1900	Thos. Wignall	Miner.	Leg broken.	Fall of slate.	Foster.
June 27, 1900	Peter Gorbet	Miner.	Back hurt.	Fall of slate.	Hynes.
June 28, 1900	Chas. Morman	Miner.	Head cut and bruised.	Fall of slate.	Hynes.
September 15, 1900	T. Keen	Miner.	Hip bone cracked.	Fall of coal.	Mystic.
October 3, 1900	C. F. Thayer	Miner.	Left hip bruised.	Fall of slate.	Laddsdale.
October 6, 1900	A. Creige	Miner.	Back strained.	Fall of slate.	Hynes.
October 13, 1900	Arthur Jones	Miner.	Bruised.	Fall of coal.	Forbush.
January 4, 1901	J. Winston	Tracklayer.	Leg broken.	Fall of slate.	Cincinnati.
January 13, 1901	S. Anderson	Miner.	Leg broken.	Fall of slate.	Hiteman.
March 25, 1901	C. W. Carlson	Miner.	Hip bruised.	Fall of slate.	Hiteman.
March 26, 1901	David Lewis	Miner.	Hand injured.	Fall of coal.	Foster.
March 26, 1901	W. Williams	Miner.	Burned.	Struck with pick.	Foster.
April 6, 1901	S. J. Wrie	Miner.	Injured internally.	Spark dropped in powder.	Eldon.
April 23, 1901	J. Doyle	Company Man.	Leg broken.	Fall of roof.	Hynes.
April 28, 1901	Burt Phillips	Machine runner.	Side hurt.	Machine.	Diamond.
May 1, 1901	Geo. Cook	Driver.	Foot injured.	Car run over foot.	Avery.
June 26, 1901	Geo. Blee	Miner.	Back and foot injured.	Fall of slate.	Avery.
January 4, 1901	R. Samuel	Tracklayer.	Severe scalp wound.	Fall of slate.	Hiteman.

EXAMINATION HELD AUGUST 28, 1901.

IOWA STATE EXAMINATION FOR MINE FOREMAN AND PIT BOSSES.
FIRST SERIES.

1. Describe fully the duties of a mine foreman of an Iowa coal mine.
2. Define the following terms: Anemometer, regulator, water indicator and tail-rope.
3. What is the ratio of the rubbing surfaces of two airways each 100 feet long when one is eight feet square and the other is six by ten and a thirds feet sectional area?
4. What does the Iowa law require in the way of fans and furnaces for the ventilation of mines, and what are the duties of the mine inspector when he finds that these devices produce an insufficient amount of air, or that the mines are being worked under unsafe conditions?
5. What is the penalty for obstructing air-courses, disturbing machinery, or doing anything that will impair the health or endanger the life of the miners, and in case the owner of a mine fails to provide for the safety of his employees after twenty days' notice, what should be done?
6. Give a rule for determining the horse-power necessary to ventilate a mine when the amount of air and the pressure required to circulate it are known.
7. Explain the principles of natural ventilation, and give reasons why the deeper shaft usually acts as an upcast in winter and downcast in summer.
8. What is the difference between longwall advancing and longwall retreating? Under what conditions would you prefer the latter process?
9. In what does an explosive develop its power? What is a black shot, and what causes it?
10. What horse-power is used to ventilate a mine using 80,000 cubic feet of air per minute when the resistance of the air as shown by the water-gauge is two inches.

SECOND SERIES.

11. What are the causes of spontaneous combustion, and how would you proceed to prevent it in a mine that produces a large amount of fine coal?
12. If a fan that makes eighty revolutions per minute produces 100,000 cubic feet of air per minute, how many revolutions must the same fan make in order to produce 100,000 cubic feet?
13. Where should a mining-shaft be located in opening up a mine, and what should be the size of shaft pillars for different depths of a mine? Under what conditions should these pillars be especially large?
14. How can the approximate velocity of an air current in a mine be determined without using an anemometer?

15. Describe an accurate method of using an anemometer in determining the velocity of an air-current in a mine.
16. Determine the motive column in a mine 400 feet deep when the temperature of the downcast is forty degrees and that of the upcast 120 degrees Fahrenheit?
17. What gases are commonly found in the coal mines of Iowa? Describe each fully and state what effect it has on the human system as well as method of testing for it?
18. How is a true meridian determined, and what is meant by the declination of a magnetic needle?
19. Describe the proper method of conducting the underground survey in a mine.
20. There are two rectangular airways each 3,000 feet long. One is 10 feet square and the other is four by 6.25 feet sectional area. When the pressure that is required to ventilate the square airway shows a water-gauge reading of 2.5 inches, what will be the pressure required to ventilate the other airway with the same amount of air?

IOWA STATE EXAMINATION FOR HOISTING ENGINEERS—1901—FIRST
SERIES.

1. What are the duties of a hoisting engineer at the coal mines of Iowa, and what natural qualities should he possess?
2. Define the following terms: Combustion, dead center, lead, tensile strength and factor of safety.
3. Determine the horse-power of a fifty-inch cylinder boiler, thirty-two feet long, when it is set one-half exposed to the heat.
4. Give a complete definition of foaming and priming, and state as far as possible the causes of each.
5. Describe a proper method of conducting a test to determine the efficiency of a boiler.
6. Determine the indicated horse-power of a single-cylinder engine having a piston ten inches in diameter with a twelve-inch stroke, when the crank makes 120 revolutions per minute, and the mean effective pressure of the steam is sixty pounds per square inch.
7. Describe the proper method of lining the crank-shaft of an engine.
8. How can hard scale be removed from the flues and sheets of a boiler, and what can you say about cleaning it at frequent intervals?
9. Describe the best method of firing a boiler that will insure economy of fuel and protection of the plates.
10. What steam pressure should be allowed in a boiler sixty inches in diameter, made of three-eighths steel plate, having a tensile strength of 50,000 pounds, when it is double riveted and operated under a factor of safety of five?

SECOND SERIES.

11. What is meant by the mechanical efficiency of an engine? Suppose the indicated horse-power of an engine is 180, and its resistance is twenty-five horse-power, what is its mechanical efficiency?
12. The diameter of a lever safety-valve is two inches. What weight must be attached to the lever twenty inches beyond the valve to allow the

steam to blow off at sixty pounds pressure, when the distance between the fulcrum and valve is four inches?

13. Explain all the principal safety appliances that are used in connection with a hoisting plant.

14. Give a full description of a block-brake and a band-brake, and state where each of these should be placed on a drum to give best results. Which of these brakes do you prefer? Why?

15. How can the safe working load of a steel cable be determined when its diameter is known? Give a rule that will apply to cables of all diameters.

16. Describe as fully as possible the method of conducting the hydraulic test of a boiler, and state when this may be better and when less satisfactory than the hammer test.

17. What can you say about erecting hoisting appliances at the beginning of a mine that will meet all the future requirements of a mine?

18. Describe the tail-rope and endless-rope systems of haulage, and explain fully the differences in the operation of each. Are both winding drums in gear at one time for tail-rope haulage? Give reasons for your answer.

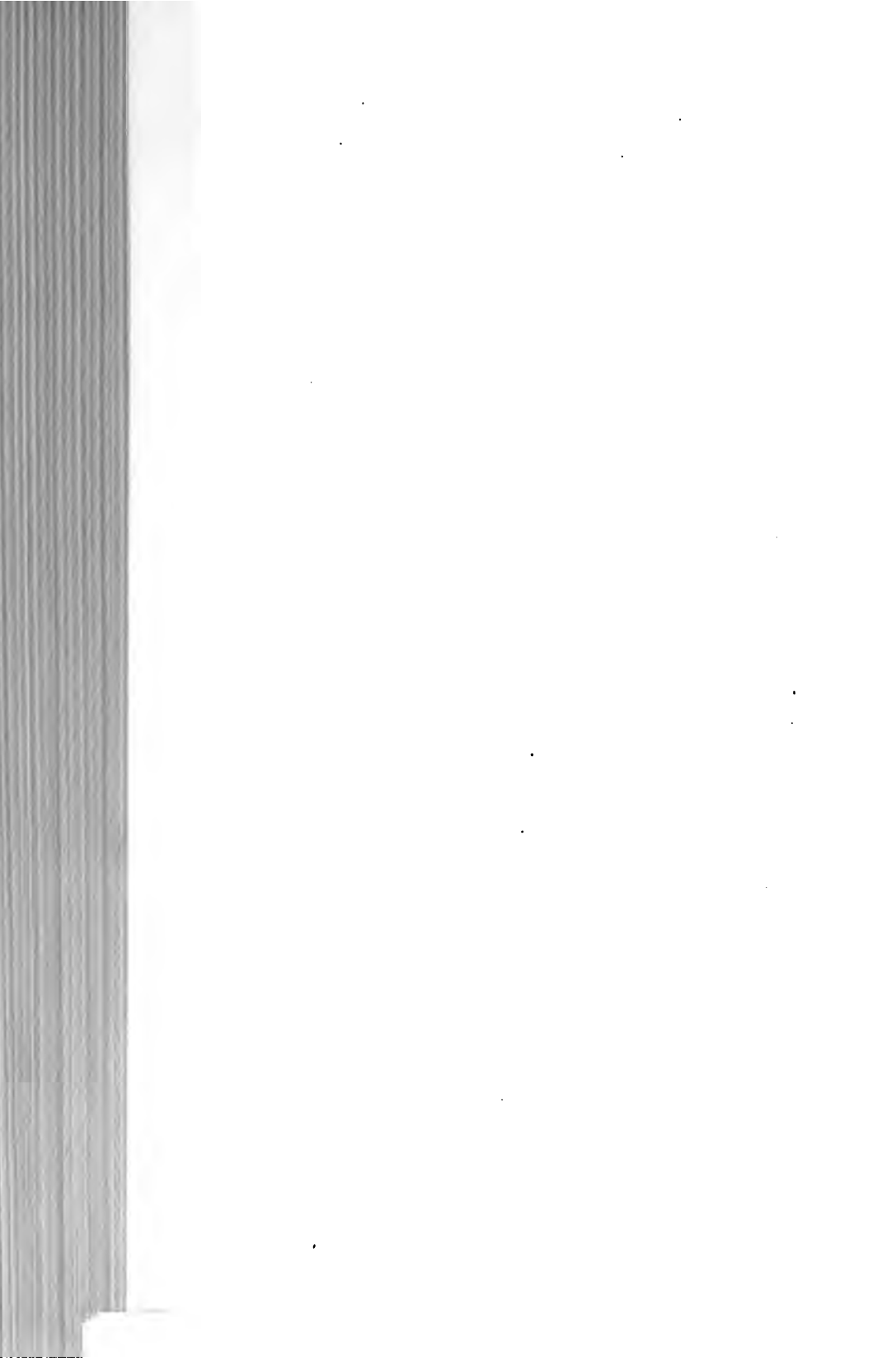
19. Describe the construction and differences between a suction-pump and a force-pump, and explain fully the forces that operate each.

20. What horse-power is required to lift 300 cubic feet of water per minute through a vertical distance of 200 feet, when the friction of the machine and the water in the pipes is one-third the power required to lift the water?

BIENNIAL REPORT
OF THE
SECOND DISTRICT,

EMBRACING
Mahaska, Keokuk, Lucas, Marion, Scott, Adams, and
Warren Counties.

JOHN VERNER, INSPECTOR.

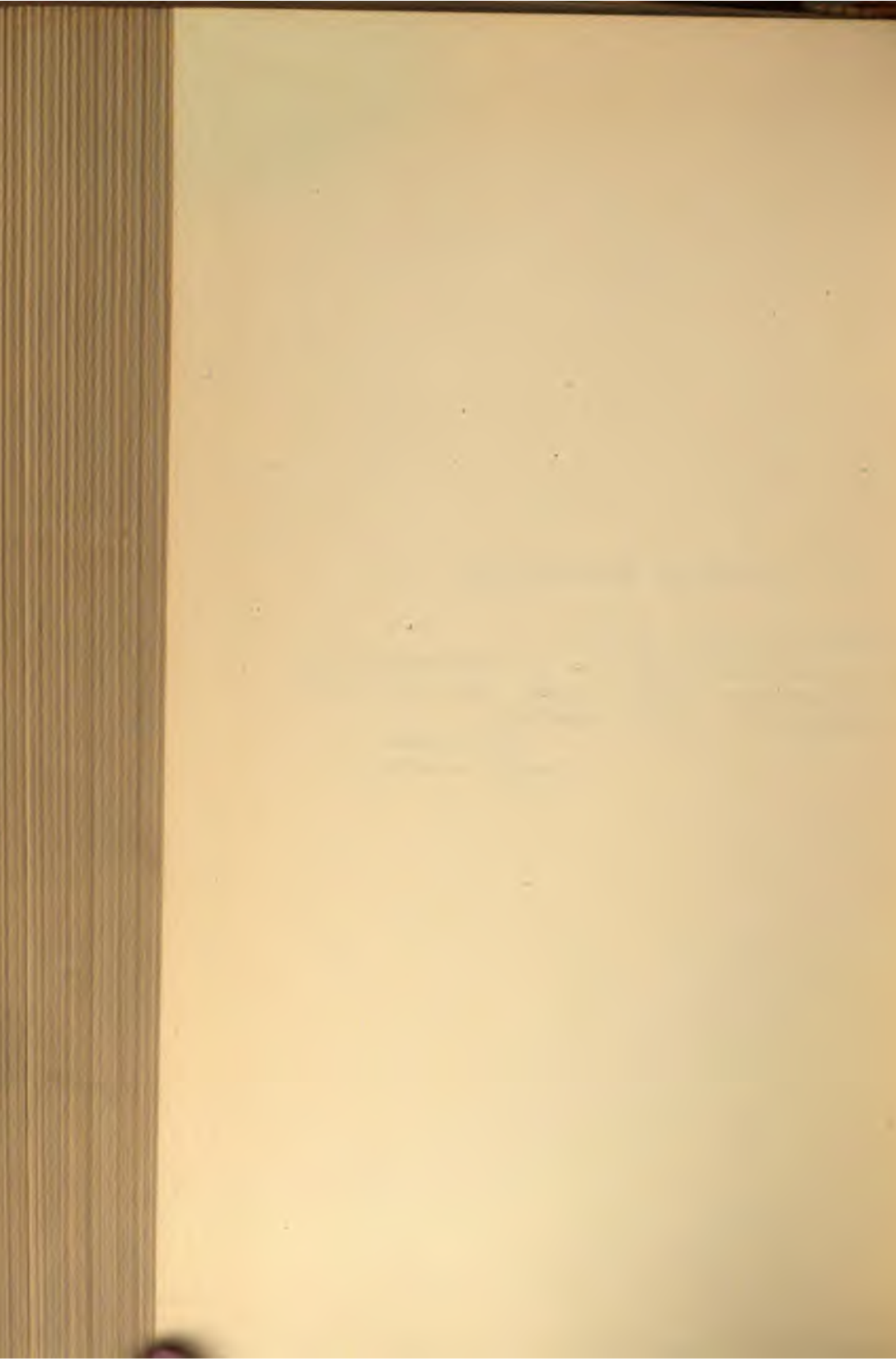


LETTER OF TRANSMITTAL.

Hon. Leslie M. Shaw, Governor of Iowa.

SIR—I have the honor to submit to you herewith the report of the Second inspection district, covering the biennial period ending June 30, 1901. Very respectfully,

JOHN VERNER,
Inspector Second District.



REPORT OF SECOND DISTRICT.

Since the last report it has been found advisable to rearrange the inspection districts to some extent. Of the counties which composed the old second inspection district only three remain in the new second district, Mahaska, Keokuk, and Scott. Jasper county was added to the third district, and Jefferson and Van Buren to the first. Adams, Warren, and Lucas from the first district and Marion from the third were placed in the second district. This arrangement makes the districts more compact, the work is divided better than formerly, and the expense of reaching the mines is somewhat reduced.

The district, as now constituted, includes the counties of Mahaska, Keokuk, Scott, Marion, Warren, Lucas, and Adams. These seven counties produced from July 1, 1899, to June 30, 1901, 3,800,337 tons of coal of all grades. This output came from 128 mines, large and small, and to mine and market it 2,759 miners and 1,252 other workmen were employed.

Comparing the output of coal in the above counties for the last two years with their output of the biennial period preceding, we note a net gain of 59,821 tons. This gain, however, is not a proportionate one in all the counties. Mahaska county's coal production diminished 346,312 tons, and Adams county's loss amounted to 9,349 tons. On the other hand, Lucas county gained 359,399 tons, Marion county 156,435 tons, Keokuk county 1,002 tons, Scott county 19,069 tons, and Warren county 9,577 tons.

During the two years the miners and others employed in and about the mines have gained many concessions from the operators. The price of mining two years ago, in those counties in the district where the coal is blasted from the solid, was 75 cents per ton of screened coal and 50 cents per ton of mine run. The screens in use then had diamond bars, spaced one and one-half inches apart. The price paid in eight foot entries was \$2 per yard. Room turning was \$4. Timbermen, drivers, tracklayers, cagers, and others employed in the mines received \$1.89 per day. Outside common labor was paid \$1.25 to \$1.50 a day.

The price of mining at present is 85 cents per ton of screened coal, and 60 to 65 cents per ton of mine run. Akron bar screens have been substituted for the diamond bar screen, and the space between the bars has been reduced one-eighth of an inch. The price paid in eight foot entries is now \$2.20 per yard and \$4.48 is paid for room turning. The price for deficient and dead work has also been proportionately increased. Timbermen, drivers, tracklayers, cagers, and others employed in the mines receive at least \$2.15 per day, and the minimum wage for outside common labor has been raised to \$1.60 a day.

I believe I can say that the last two years have been the most successful in the coal trade of Iowa. Successful, not only from the operators' point, but from the miners' as well. Abundant crops, heavy railroad traffic, prosperity in general, and the total absence of strikes and lockouts have contributed to give to the miners steadier work with better pay than the operators the fair profit they are entitled to. The yearly meetings of the operators and miners, to adjust the wage-scale in a way that will be mutually satisfactory, have also had their influence, and have done much to place the coal business on a more staple basis. It means more to the operator to have the reasonable assurance that he can run his mine a year, without having to fear or take into consideration when making contracts emergencies that may arise on account of wage disputes between himself and the miners in his employ. On the other hand the miners are equally benefited by this arrangement. He knows that, after the ratification of the yearly agreement, for twelve months he may labor at fair wages without dread that his earnings may be cut off and himself and family in want through a strike or lockout. It is to be hoped that the miners and operators will continue to adjust what differences may arise between them with the spirit of justice and fairness that has prevailed in the past.

The condition of the mines in the district with regard to safety has been fair. Considerable work has been done during the last two years to make about improvements in this direction. Additional escape-shafts have been provided in a number of mines, the haulage and traveling roads have been kept reasonably safe, and the safety appliances in use have in the main been found satisfactory and in good order. Not a man has been injured on account of unsafeness of entries in going to or returning from his work during the last two years, and no serious accident has resulted from defective safety appliances. Especial attention has been given to secure the safety of the miners in case of fire, and in some mines danger on that score has been reduced to a mere minimum. In a few cases mine stables were found located that a fire breaking out in them would have proved a serious danger to the men in the mine at that time, but these stables have either been abandoned or measures provided to insure greater safety should a fire break out in them. In the absence of any legislation on this matter, I suggest that in the future all stables put underground be built as nearly fireproof as possible and that they be so located that they can be ventilated by a separate shaft directly connected with the return air current. Hay and straw should not be permitted to accumulate in any part of a mine, and the storage in the mine of large quantities of explosives and oil in one place should be avoided. Some months ago the miners in most mines in the district, where powder was used, requested the operators to send the powder ordered by them to the working places. The operators have generally complied with this request, and in some mines, to facilitate the handling of the powder, storage-rooms for it have been provided to hold a day's or perhaps two days' supply. The danger incident to such storage is so grave that there should be no delay in discontinuing the practice, wherever it may exist.

The present mode of conveying the powder under this new arrangement through the mines is certainly more dangerous than the old way of getting the powder to the working places. I know what it means to carry a large quantity of powder for long distances underground, and I appreciate the desire of

ner to be relieved of this tiresome task, but comfort purchased at the expense of safety is dearly bought. In each of the larger mines in the district from twenty to forty kegs of powder are used daily. Under the old system these kegs were taken inside by the miners who purchased them, and were carefully guarded by them against mishaps. Now the kegs are placed in one or two mine-cars, and in this way from 500 to 1,000 pounds of powder, in an almost compact mass, are sent into the mine during working hours. If by careless handling or by accident this mass of powder should explode a horrible calamity would result, and the loss of life would probably be limited only by the number of men in the mine at the time. The danger may be remote, but it exists. The possibility of such explosion occurring and its consequences should be sufficient to cause the discontinuance of a practice that apparently was adopted without due consideration of the danger involved. I do not object to the operators taking care of the powder until it reaches the purchaser at the working face, but it should be transported through the mines under safer conditions than prevail now.

While there has been no retrogression with regard to the sanitary conditions of the mines of the district, and while in many instances decided improvements along this line have been made, it remains a fact that perfection in this respect is still a long ways off. The powder-smoke nuisance is particularly objectionable. Nearly all the coal in the district is mined by blasting it from the solid, and in all the mines where powder is used, except a few, the practice prevails of firing twice a day, in the middle of the shift and at quitting time. The ventilation provided for the mines, while with the best of care and in the absence of shot firing, sufficient to air them properly, is in a number of instances inadequate in those mines, where firing is done in the middle of the shift, to remove all the powder-smoke and gases by the time the miners have to commence work again in the afternoon. Considerable relief has been offered in some mines by the sinking of additional ventilating shafts, in others the cleaning up of airways and splitting the air current has been of benefit; yet results have not been entirely satisfactory.

It has been suggested that the best way out of the difficulty would be to stop firing at noon. That would be an effective remedy, and would work very well in mines where the coal is of fair thickness and blasts well; but unfortunately nature has failed to provide such favorable conditions in all mines. I did not feel justified, except in aggravated cases, to apply this remedy, because in a large number of mines in this district an action of that kind would mean a reduction in the earnings of the miners working in them, as well as a reduction in the profits of the operator by reason of a decreased daily tonnage. I favor continuing the practice of firing twice a day, if it can be done without injury to the miners' health. I believe it is to the advantage of the miner and may in some respects promote his safety. It appears to me that it would be of decided benefit to the operators of mines, especially favored by nature, to remove the objection to twice-a-day firing by providing means of ventilation of such power and capacity that the mines can be practically cleared of smoke by the time the miners are ready to start to work again after dinner.

Below will be found the tables giving the amount of coal produced each county of the district in the last two years, the number employed, their earnings, etc. In this connection I wish to express appreciation of the promptness of the operators in forwarding to the their yearly reports on which these tables are based. Every mine that produced more than 8,000 tons of coal last year has reported, and of the mines nearly ninety per cent have sent in their reports.

TABLE No. 1.

Showing the number of mines, output of coal, number of miners and employees, etc., in District No. 2 for the year ending June 30, 1900

COUNTY.	Number of mines.	Tons of coal of all grades produced.	Number of miners employed.	Gross earnings of miners.	Number of other employees.
Mahaska	30	1,235,933	1,578	\$ 788,249	758
Keokuk	18	299,092	435	198,210	171
Marion	28	203,568	338	148,851	171
Lucas	8	133,196	191	100,529	122
Warren	8	21,805	58	20,053	16
Scott	8	19,650	72	22,597	11
Adams	18	16,370	113	18,507	20
Total	127	1,930,214	2,785	\$1,206,096	1,269

TABLE No. 2.

Showing the number of mines, output of coal, number of miners and employees etc., in District No. 2 for the year ending June 30, 1901

COUNTIES.	Number of mines.	Tons of coal of all grades produced.	Number of miners employed.	Gross earnings of miners.	Number of other employees.
Mahaska	30	1,072,493	1,459	\$ 777,742	728
Keokuk	17	261,798	381	173,953	158
Lucas	7	249,803	284	174,659	166
Marion	28	228,667	368	156,332	141
Scott	10	22,469	76	24,395	12
Adams	17	18,381	111	24,859	16
Warren	10	16,572	55	15,255	14
Total	128	1,870,123	2,734	\$ 1,347,195	1,235

TABLE No. 3.

increase or decrease for the year ending June 30, 1901, as compared with the year ending June 30, 1900.

COUNTY.	NUMBER OF MINES.		TONS OF COAL OF ALL GRADES PRODUCED.		NUMBER OF MINERS EMPLOYED.		GROSS EARNINGS OF MINES.		NUMBER OF OTHER EMPLOYEES.		EARNINGS OF SAID EMPLOYEES.	
	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.
Mahaska			163,440		119		\$ 10,507		30		\$ 3,101	
Keokuk	1		37,894		54		24,257		13		6,444	
Lucas	1		116,607		93		\$ 74,130		44		\$ 48,207	
Marion			25,039		30		7,481		30			949
Union	2		2,819		4		1,798		1		1,098	
Warrick	1		2,011		2		6,352		4			438
Warrick	2		5,233		3		4,798		2			945
Total	1		60,091		51		\$ 50,190		34		\$ 37,425	

The last table is a very interesting one, and should prove especially gratifying to the representatives of the miners, who met the operators a year ago to adjust the scale for the year ending March 31, 1901. The mines were on an average of fifteen days less during the year ending June 30, 1901, than in the year preceding. In the last year the tonnage in the counties of Mahaska, Keokuk, Lucas and Marion fell off 59,688 tons, and fifty less miners were employed. Yet, notwithstanding this, the gross earnings of the miners in these counties increased during last year \$46,847 over their earnings of the year before. The decrease in tonnage in Mahaska county was 163,440 tons and the decrease in miners' earnings only \$10,507, while Keokuk county's output decreased 37,894 tons, and the miners' earnings \$4,257. It appears at the first glance that the showing from these two counties is very disproportionate, but investigation shows that there is nothing wrong with it. Very little has been paid by the operators of Keokuk county for deficient work, because there was little of that kind of work to do; the expense for lifting bottom or brushing has been very light, and in addition about one-half the coal produced in the last year in the county has been mined without a cent of expense for narrow work or room turning on account of the exceptionally large amount of pillar work done. The case is very different in Mahaska county. Considerable low coal was worked last year at an advance per ton over the scale price; the expense of taking bottom and taking down top to make height has been very great, and there was a great deal of deficient work to pay for. The yardage and room turning account was proportionately very much larger than the same account in Keokuk county. The figures for Lucas and Marion county also need explanation. While Marion county's increase in tonnage last year was more than one-fifth that of Lucas county, the Marion county miners' earnings reached only one-tenth the increase gained by the miners of Lucas county. The number of small mines in Marion county is considerable, and they are run on an as inexpensive scale as possible. Some of them are not worked by union labor, and the prices paid in these mines are generally

below the scale. In Lucas county, large mines have been recently developed. Their development has been rapidly pushed, and the great expense for narrow work, room turning, deficiencies, and dead work offers a sufficient solution why there has been such difference in the miners' earnings in the two counties. The number of other employed miners, in Mahaska, Marion, Lucas and Keokuk counties was two less in the last year than it was in the year before. Still, the 1193 employed earned \$37,710 more in the last year than the 1222 employes earned in the preceding one. The principal mines in the district worked about the same last year. Now, if the agreement of 1900 increased the daily wages of these employes 12 cents for each day worked in the twelve months ending June 30, 1901, and I believe it increased it fully that much over the wage paid each during the year ending June 30, 1900, we have a total earnings on that score of \$37,221, a sum almost identical with the total in the table.

MAHASKA COUNTY.

Mahaska county still maintains its position at the head of the list of coal-producing counties of Iowa. For more than twenty-five years it has produced more coal each year than any other county in the state. It begins to look as if its supremacy in this respect is about ended. The extraordinary development of mines in Monroe county in the last year has far outranked development work in Mahaska county; and, unless something is done quickly to offset the advantage gained by its neighbors to the south, the indications are that Mahaska county will have to be satisfied with its second place.

The extension of the Chicago and North-Western Railway across the Moines river will prove of great advantage to the mining industry of Mahaska county. The extension has made available valuable coal territory which promises to yield more coal than has been produced in Mahaska county since the beginning of coal mining in it. At present only one mine shipping coal over the new road, is operated in the county on the west side of the river; but a great deal of prospecting has been done in the new territory and other mines will probably be opened in the near future. West of Council Bluffs and south of the now abandoned No. 4 mine of the American Coal Company, a new mine has been recently opened by the Garfield Coal Company. The coal in this mine, so far as it has been developed, is of fair quality, averaging more than five feet, and the mine promises to become one of the large producers of the county. Several fair-sized basins of coal have been located southeast of the Garfield property, and their development is a question of time. I am informed that a new mine will be opened near the town of Colon, with shipping facilities over the Chicago and North-Western road. Prospecting is going on in different parts of the county, but the results at this time are not definite enough to base predictions on as to what tracts prospected contain coal enough to warrant their development.

Of the mines now in operation in the county having railroad facilities, eight are located on the Chicago and North-Western Railroad, one on the Iowa Central, and one on the Iowa and Pacific, and one on the Iowa Central road.

Mechanical underground haulage is largely in use. Two endless ropes, ten tail-ropes, and one electric motor convey the coal to the shaft bottoms, and three single ropes in slopes pull it to the tipples. The electric motor in use in the Pekay mine seems to do the work satisfactorily, and there is no doubt that this kind of haulage is a success, if conditions are favorable. It appears to be not economical in mines where a solid roadbed cannot be made and maintained at a moderate cost, and where many and variable grades have to be run over.

The provisions made during the last two years to insure the safety of those employed in the mines of the county have been satisfactory. Ten air escape shafts have been sunk, and other commendable improvements have been made to render the mines as safe as possible. Of twenty-seven fatal and non-fatal accidents occurring in the county in the last two years, none was caused through the absence or faulty construction of safety appliances.

All the large mines and some of the smaller ones are ventilated by fans. Fifteen are now in use in the county; eighteen of these are run by steam and one by electricity. These fans provide more than 375,000 cubic feet of air every minute to ventilate the mines. More than the minimum air volume required by law enters each of these mines. In some of them, however, the air-current is not strong enough to remove readily the great amount of powder-smoke due to the firing of many shots at the same time, and the miners working in them are therefore compelled to labor, for a time at least, in an atmosphere that is decidedly injurious to health. I have spoken on this matter before, and I again urge the operators, if the practice of twicely firing is to continue in these mines, to increase by some adequate method the volume of air going through them immediately after firing time.

KEOKUK COUNTY.

For seven years Keokuk county has ranked fifth among the coal counties of Iowa, Mahaska, Polk, Monroe and Appanoose have stood ahead of it in number of tons of coal produced annually. It is not probable that the county can maintain that position in the future. The mine that has been the best producer in the last few years, the Crescent No. 4, is about to be abandoned, and the Columbian mine, almost equal to the Crescent, cannot last much longer, unless the coal deposits that can be reached from this mine are larger than the prospect holes put down in the adjacent territory seem to indicate. So far there have been no new mines developed of sufficient capacity to make up for the falling off in the county's coal output that will be caused by the giving out of these two mines. While some take a rather pessimistic view of the situation, there is no reason to fear that the coal wealth of the county is about exhausted. It is true that the workable coal area is small, and is confined almost altogether to the northwestern part of the county; it is also true that a considerable portion of this area has been worked out, yet it is very probable that good coal fields can still be found if thorough and systematic prospecting is resorted to to locate them. Five mines have shipping facilities over the Chicago & North-Western Railroad, and two ship over the Burlington, Cedar Rapids & Northern.

New mines have recently been opened by the Lambert Bros., the M Coal company, and Bakers Bros. They are located in the vicinity of Cheer.

The mines now in operation are not very extensive, and on that account mechanical haulage is not found in any of them, the Blatt mine except. In that mine single rope haulage is in use.

The mines in the county, as far as safety is concerned, compare favorably with any in the district. Four air and escape shafts have been sunk during the last two years. Two fatal accidents occurred, and four non-fatal accidents were reported. Two hundred eighty thousand, seven hundred forty-five tons of coal were mined for each fatal accident.

The fair thickness of the seam, and the consequent roomy condition of the airways, ventilating machinery of ample power, together with the general limited extent of the mine workings, make the problem of ventilation comparatively easy. In the mines where stoppings were properly constructed and looked after, and ordinary care was taken to direct the air current to the working faces, little or no complaint on account of insufficient ventilation was made by the miners employed in them. Neglect on the part of the mine foremen to make good use of the air volume at his disposal brought just complaints from the men. In such cases speedy improvement of conditions was asked for, and generally obtained to a satisfactory result.

LUCAS COUNTY.

In my report of the first district, made in 1893, the following was said about the condition of the mining business in Lucas county: "Lucas is the second coal producing county in the state, with an output of over a million tons per annum, it has now taken a position almost at the foot of the list. At present only two small mines are struggling along to keep the name of Lucas county from being wiped out altogether from the roster of coal-producing counties. There is no question that coal in paying quantities can be found here, but the reason for not developing it seems to be the expense account to reach it would show up rather heavy. Be that as it may, the time will come when the coal fields of Lucas county will again employ to hundreds of men." The time has come, and I am glad to say that my predictions have proved to be correct. From twentieth place among the coal producing counties of the state in 1893, Lucas county now occupies seventh place, and the indications are that during the next few years it will move still higher in the list. This change from a practically dormant state to one of great activity has been effected in the last two years and is due to the opening of mines by the Whitebreast Fuel Company of Illinois, and the Big Hill Coal Company, in the western part of the county near the towns of Lucas and Cleveland, not far from the old coal fields that has yielded millions of tons of coal, and where mining was carried on from 1876 to 1891. Cleveland No. 4 mine, worked by the Whitebreast Company of Illinois, has probably produced more coal during the last year than any other mine in the state. The best day's output of this mine was 1,058 tons of mine run, and it was handled in seven and one-half hours.

More than 300 men are employed in and about this mine. The

al Company's mine at Lucas has been worked so far under great disadvantage, due mainly to the large amount of water that found its way into the mine through a porous sandstone that immediately overlies the coal. In the south and southwest portions of the mine, however, the inflow of water is apparently stopped, and if this condition continues the mine's development will be more rapid and a corresponding increase in its output will result. The Chicago, Burlington & Quincy railroad furnishes shipping facilities for these two mines, and also for the mine operated by the Lucas Cleveland Coal Company. A new mine is about to be opened, three miles north of Chariton, by the Inland Coal Company.

The principal coal seam worked in the county lies at considerable depth below the surface. North of Chariton the new shaft will reach the coal in about 225 feet; the Big Hill Coal Company's shaft is 274 feet deep; and the shaft of the Cleveland No. 4 mine has a depth of 321 feet. The latter is the deepest shaft in the state at present. The coal is of good quality, and will average four and one-half feet in thickness. The Lucas and Cleveland Coal Company works a seam belonging to the middle coal measures; the coal is 6 feet thick and is worked long wall.

The mines were operated 260 days during the last year.

Six fatal and six non-fatal accidents occurred in the mines of Lucas county the last two years. Only 63,833 tons of coal were produced for each fatal accident. This is an extremely bad showing, and I hope that the miners and operators will use the utmost care to prevent, as far as possible, the recurrence of fatal and serious accidents in the future. It seems that good work in this direction has been done already. Since the explosion in No 4, January 5, 1901, up to this time (August 15th), only three accidents, causing slight injuries, have occurred.

The ventilation of some parts of the mines has at times been insufficient, the deficiency was caused by adverse circumstances rather than through neglect on the part of the mine officials. Fan ventilation has recently been substituted for ventilation by steam jet by the Lucas and Cleveland Coal Company, and efforts are being made in the other mines to put them in good sanitary condition as possible.

MARION COUNTY.

Marion county is very rich in coal deposits, and we find it stated in the geological report of the county, issued this year, that "almost the entire county is underlain by coal. Yet," the report says further, "notwithstanding these abundant deposits, mining has not been carried on nearly so extensively as in some of the adjoining counties, particularly Mahaska. The reason for this non-development of the mining industry in this region has been neither the character of the coal nor the thickness of the seams, but the lack of railway facilities for the transportation of the product." It is true that railroad facilities to reach the main coal basins of the county have not been provided, but there has existed so far seemingly little necessity for them. Furthermore, there is yet an abundance of undeveloped coal within easy reach of the railroads. In my opinion, the principal reason why developments have been somewhat slow has not been due so much to the

lack of railroad facilities, but rather to the lack of available. Taking everything into consideration, Marion county has not done recently in developing its mineral resources. Since 1898 the coal production of the county has increased 71 per cent, and there is every indication that the healthy growth of the coal business will continue.

Three railroads, the Chicago, Burlington & Quincy, the Wabash, and the Chicago, Rock Island & Pacific furnish transportation to get the coal to market.

The two mines having the largest output at present are located on the Wabash railroad, one is the mine operated by the Wild Rose Coal & Iron Company at Morgan Valley, and the other is No. 1 mine at Hamilton owned by the Donley Coal Company. Four mines have switches on the Chicago, Burlington & Quincy railroad, and one mine at Otley has a connection with the Des Moines line of the Rock Island.

About two years ago a shaft was sunk by the O. K. Coal Company six miles west of Bussey, and on the north side of Cedar Creek, into a coal seam between eight and nine feet in thickness. The mine was at first undeveloped to some extent, but for more than a year and a half it has been idle. Owing to the considerable distance of the mine from the railroad, the coal could not be hauled by wagons, loaded on the cars, and sold at a profit. This difficulty has, however, been overcome. A switch has been run six miles in length starting near the town of Tracey, and running along the north bank of Cedar Creek, now connects the mine with the Wabash railroad. The prospecting record of the field, in which the mine is located, indicates that its yield should be very large. Another mine is about to be opened on the Knoxville branch of the Chicago, Rock Island & Pacific railroad. It will be located north of Flagler, and be operated by the American Coal Company. The vein is of good thickness and easily reached. The mine promises to become one of the large mines of the district.

The amount of coal hauled by wagons from the smaller mines in the towns of Hamilton, Flagler, and Otley, and loaded on the cars, is considerable. About 27,000 tons were handled in this way last year.

It may confidently be expected that the next year's output of coal from Marion county will show a material increase over the output of the year just past.

Only four of the county's twenty-eight mines are ventilated. Small furnaces are used in the others to furnish ventilation. In the small mines little difficulty is experienced in airing them satisfactorily, and as little work is done in them in the summer and the number of men employed in them very small, the decreased efficiency of such ventilation during the warmer months does comparatively little harm. There is an evident lack of interest on the part of the operators of small mines to improve them, make them safer, and better their sanitary condition.

SCOTT COUNTY.

Scott county has produced coal for a long number of years, but its total output from the time mining first commenced in the county to the present time represents a very respectable tonnage, the production of each year has never been large. In the last two years mining has

carried on more actively and extensively, resulting in a marked increase of the output, the coal production for the two years amounting to 42,119 tons.

The coal averages about three feet in thickness. It is worked on the room and pillar plan, and the miners receive from a dollar to a dollar and a half cents a ton for mining the coal and delivering it at the shaft bottom. In the mines west of Buffalo the coal is blasted from the top; but in the mines around Jamestown no powder is used. None of the mines are located near a railroad, consequently little coal is shipped. Jamestown is the center of the mining industry, and the principal mines of the county are located near that place.

At only one mine steam power is found to hoist the coal, horses being used for that purpose at the others. Ventilation is maintained by small furnaces in all the mines, except in the mine operated by Buchmeier & Arlin which has fan ventilation. The mines are cheaply equipped, yet the equipments are adequate under the circumstances to insure reasonable safety to the men working in them. No accident of a serious nature has occurred in the mines of Scott county during the last two years.

ADAMS COUNTY.

The mines in Adams county produced in the last two years 34,751 tons of coal, and about 175 men found employment in work in and around the mines and in hauling the coal to market. The mines are all small, none have shipping facilities, and they are depending entirely on the local markets. There are no manufacturing or other industrial establishments to supply, and as the demand for coal for domestic use is very light in the summer, nearly all the mines are idle during that season of the year. In the winter, however, especially if the roads are in good condition, the demand generally exceeds the supply.

The coal seam, which averages about sixteen inches in thickness, is the thickest worked in the district. It is reached by shallow shafts and is worked long wall. The miners receive from five to six cents a bushel for mining and delivering the coal at the shaft bottom. Most of the county's coal output comes from the mines in the vicinity of Carbon. Mines are also worked near Eureka, Briscoe, and Hoyt.

Mine ventilation is produced by small furnaces, and in cold weather natural ventilation is generally sufficient to air the mines satisfactorily. Owing to the thinness of the seam, the method of working it, and the good luck, accidents of a serious nature are very rare, and none has occurred during the last two years.

WARREN COUNTY.

Warren county contains considerable coal, and its yearly output could be largely increased, were it not for the fact that railroad facilities to market the coal profitably have been lacking so far. There is only one small mine in the county that can load its product on the cars without hauling it by wagons. The larger mines are located at and near Somerset. Two different

seams are worked in this vicinity. The upper seam is about three feet thick and is worked long wall, the lower seam is somewhat thicker, and is worked on the room and pillar plan. The mines produced 38,377 tons of coal in the last two years, and about seventy-five men were employed. Small mines have been opened in different parts of the county to supply the local demand for coal. They employ from two to six men each in the winter, but are generally closed down during the summer.

Most mines depend on natural ventilation, a few are aired by small fans, and one mine will be ventilated by a fan run by a gasoline engine.

One serious accident occurred in the mines of the county during the last two years.

Mines in operation in District No. 2, their location, etc.

CORPORATION, FIRM OR OPERATOR.	Mine number.	LOCATION OF MINE.	Railroad connections, if any.	Kind of opening.	PLAN OF WORKING MINE.	Means of ventilation.	Kind of hoist.	KIND OF HAULAGE.
Consolidation Coal Co.....	9	4 miles east of Eddyville.....	C. & N. W.	Shaft.	Room and pillar	Fans.....	Steam.....	Endless rope and mule.
Lost Creek Fuel Co.....	1	1/2 mile south of Lost Creek.....	C. & N. W.	Shaft.	Room and pillar	Fans.....	Steam.....	Mule.
Lost Creek Fuel Co.....	2	3 1/2 miles east of Eddyville.....	C. & N. W.	Slope.	Room and pillar	Furnace.....	Steam.....	Mule.
F. D. Coryell & Son.....		3 1/2 miles south of Pekay.....	C. & N. W.	Shaft.	Room and pillar	Fans.....	Steam.....	Mule.
Regal Coal Co.....	28	1 mile south of Muchaknock.....	Iowa Central.	Slope.	Room and pillar	Fans.....	Steam.....	Tail rope, electric moter, mule.
Kennebuck Coal Co.....		5 miles south of Okkalooosa.....	C. & N. W.	Shaft.	Room and pillar	Fans.....	Steam.....	Rope and mule.
Iowa Fuel Co.....		Colon.....	C. & N. W.	Shaft.	Room and pillar	Fans.....	Steam.....	Tail rope, mule.
J. Baxter.....		Morrisville.....	C. & N. W.	Shaft.	Room and pillar	Furnace.....	Horse.....	Mule.
Smith Bros.....		4 1/2 miles east of Okkalooosa.....	C. & N. W.	Shaft.	Room and pillar	Natural.....	Steam.....	Mule.
Atwood Coal Co.....		2 miles north of Atwood.....	C. & N. W.	Slope.	Room and pillar	Furnace.....	Steam.....	Mule.
Barrowman & Oakley.....		North of Carbonado.....	C. & N. W.	Slope.	Room and pillar	Furnace.....	Steam.....	Mule.
G. Clough.....		1 mile north of Okkalooosa.....	C. & N. W.	Slope.	Room and pillar	Furnace.....	Steam.....	Mule.
F. Schultz.....		4 1/2 miles NE of New Sharon.....	C. & N. W.	Slope.	Room and pillar	Fans.....	Steam.....	Rope, mule.
Evas Coal Co.....	3	3 1/2 miles NE of New Sharon.....	C. & N. W.	Slope.	Room and pillar	Furnace.....	Steam.....	Mule.
Geo. Cook.....		1 1/2 miles west of Okkalooosa.....	C. & N. W.	Shaft.	Room and pillar	Furnace.....	Horse.....	Mule.
Oskaloosa Fuel Co.....		Sw of Okkalooosa.....	C. & N. W.	Shaft.	Room and pillar	Fans.....	Steam.....	Mule.
M. Carey.....		1/2 mile NW of Rose Hill.....	C. R. I. & P.	Shaft.	Room and pillar	Furnace.....	Steam.....	Mule.
Little-Hoover Coal Co.....		N of Beacon.....	C. R. I. & P.	Shaft.	Room and pillar	Fans.....	Steam.....	Mule.
Snowden Coal Co.....		1 1/2 miles SE of Leighton.....	C. R. I. & P.	Shaft.	Room and pillar	Fans.....	Steam.....	Mule.
Frey Bros.....		1 1/2 miles SE of Leighton.....	C. R. I. & P.	Shaft.	Room and pillar	Furnace.....	Steam.....	Mule.
Wm. Patterson & Son.....		2 miles W of Evans.....	C. R. I. & P.	Shaft.	Room and pillar	Furnace.....	Steam.....	Mule.
American Coal Co.....	5	3 1/2 miles W of Evans.....	C. R. I. & P.	Shaft.	Room and pillar	Furnace.....	Steam.....	Mule.
Richard Bros.....	1	1 1/2 miles W of Evans.....	C. R. I. & P.	Slope.	Room and pillar	Fans.....	Steam.....	Mule.
Garfield Coal Co.....	2	Nw of Beacon.....	C. R. I. & P.	Slope.	Room and pillar	Fans.....	Steam.....	Tail rope, mule.
Oskaloosa Coal and Mining Co.....	1	1 mile W of Beacon.....	C. R. I. & P.	Slope.	Room and pillar	Fans.....	Steam.....	Mule.
Oskaloosa Coal and Mining Co.....	2	2 miles S of Beacon.....	C. R. I. & P.	Shaft.	Room and pillar	Fans.....	Steam.....	Tail-rope, mule.
Mahaska Coal and Mining Co.....	3	1 mile S of Beacon.....	C. R. I. & P.	Shaft.	Room and pillar	Fans.....	Steam.....	Tail-rope, mule.
Eveland Coal Co.....	4	1 mile S of Beacon.....	C. & N. W.	Slope.	Room and pillar	Fans.....	Steam.....	Tail-rope, mule.

KEOKUK COUNTY.

CORPORATION, FIRM OR OPERATOR	Mine No.	LOCATION OF MINE.	RAILROAD CONNECTION, IF ANY.	Kind of Open ^g .	PLAN OF WORK-ING MINE.	Means of Ven-tilation.	Kind of Hoist.	KIND OF HAULAGE.
M. Fisher.....	S of Delta.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
R. W. Allison.....	3 miles N of Delta.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
Bell & Teeters.....	1 1/2 miles N of Delta.....	C. R. & N.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
Volunteer Coal Co.	1 1/2 miles NE of What Cheer B.....	B. C. R. & N.....	Shaft.....	Room and pillar.....	Furnace.....	Steam.....	Mule
Margaret Coal Co.	1 mile N of What Cheer.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Steam.....	Mule
T. Grinstead.....	E of What Cheer.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
T. Mason.....	E of What Cheer.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
Hugh Murray.....	N of What Cheer.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
Winchell.....	NW of What Cheer.....	.....	Slope.....	Room and pillar.....	Furnace.....	Horse.....	Rope, mule
Grady Bros.	S of What Cheer.....	.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	Mule
D. Peacock.....	2 1/2 miles NW of What Cheer.....	C. & N. W.....	Shaft.....	Room and pillar.....	Furnace.....	Horse.....	
Crescent Coal Co.	4	2 1/2 miles NW of What Cheer.....	C. & N. W.....	Shaft.....	Room and pillar.....	Furnace.....	Steam.....	Mule
H. Martin & Son.....	2 1/2 miles NW of What Cheer.....	C. & N. W.....	Shaft.....	Room and pillar.....	Jet.....	Steam.....	(New mine)
Baker Bros.	1 1/2 miles W of What Cheer.....	C. & N. W.....	Shaft.....	Room and pillar.....	Furnace.....	Steam.....	Mule
Labbert Bros.	1 1/2 miles W of What Cheer.....	C. & N. W.....	Shaft.....	Room and pillar.....	Furnace.....	Steam.....	Mule
Columbian Coal Co.	3	2 miles W of What Cheer.....	C. & N. W.....	Shaft.....	Room and pillar.....	Furnace.....	Steam.....	Mule

LUCAS COUNTY.

Whitebreast Fuel Co. of Ill.	4	Cleveland	C. B. & Q.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Mule
Big Hill Coal Co. ....	.....	Lucas.....	C. B. & Q.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Mule
Lucas & Cleveland Coal Co. ....	.....	1 mile E of Lucas.....	C. B. & Q.....	Shaft.....	Longwall.....	Fan.....	Horse.....	Mule

MARION COUNTY.

Buwalda Bros. ....	.....	2 miles NW of Pella.....	.....	Shaft.....	Room and pillar.....	Jet.....	Steam.....	
J. R. Dieleman .....	.....	1 1/2 miles NW of Pella.....	.....	Shaft.....	Room and pillar.....	Jet.....	Steam.....	

Youkon Coal Co.	W of Otley	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule, rope, mule.
Wild Rose Coal and M. Co.	Morgan Valley	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
Dunreath Coal Co.	Dunreath	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
H. B. Hayes	4 1/2 miles SE of Knoxville	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
Hawkeye Coal Co.	1 1/2 miles W of Flagler	C. B. & O.	Shaft	Room and pillar	Furnace	Steam	Mule.
S. R. Rollings	Flagler	C. B. & O.	Shaft	Room and pillar	Furnace	Steam	Mule.
O. K. Coal Co.	5 miles W of Bussey	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
O. K. Coal Co.	1 mile W of Bussey	C. B. & O.	Shaft	Room and pillar	Furnace	Steam	Mule.
Hamilton Coal Co.	1 mile NW of Hamilton	C. B. & O.	Shaft	Room and pillar	Furnace	Steam	Mule.
Ennis & Stillwell	W of Hamilton	C. B. & O.	Shaft	Room and pillar	Furnace	Steam	Mule.
George Davis	NW of Hamilton	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
Donley Coal Co.	Hamilton	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
Donley Coal Co.	2 miles NW of Hamilton	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.
Donley Coal Co.	3 miles NW of Hamilton	Wabash	Shaft	Room and pillar	Furnace	Steam	Mule.

SCOTT COUNTY.

A. McDonald	2 1/2 miles NW of Buffalo	Wabash	Shaft	Room and pillar	Furnace	Horse	Pushers handle the cars.
Ed. McCollough	N of Buffalo	Wabash	Shaft	Room and pillar	Furnace	Horse	
Metzger & Kaucher	Jamestown	Wabash	Shaft	Room and pillar	Furnace	Horse	
L. Long	Jamestown	Wabash	Shaft	Room and pillar	Furnace	Horse	
Chas. Sass	Jamestown	Wabash	Shaft	Room and pillar	Furnace	Horse	
E. T. Langwith	Jamestown	Wabash	Shaft	Room and pillar	Furnace	Horse	
Buchmeier & Carlin	Jamestown	Wabash	Shaft	Room and pillar	Furnace	Horse	
Theo. Krantz	Two miles west of Buffalo	Wabash	Shaft	Room and pillar	Furnace	Steam	Tail-rope, mule.
Thos. Webster	Two miles west of Buffalo	Wabash	Shaft	Room and pillar	Furnace	Horse	
		Wabash	Shaft	Room and pillar	Furnace	Horse	

ADAMS COUNTY.

I. M. Henton	Eureka	Wabash	Shaft	Longwall	Furnace	Horse	The miners push and cage their own coal.
Ed. Amdor	1 1/2 miles NW of Eureka	Wabash	Shaft	Longwall	Furnace	Horse	
W. R. Miller	Briscoe	Wabash	Shaft	Longwall	Furnace	Horse	
C. W. Powley	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
N. S. Wheelen	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
John Ruth	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
Rees & Perks	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
E. McKee	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
M. Jones	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
T. Gebbie	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
S. O. Trowbridge	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
R. F. Wilds	Carbon	Wabash	Shaft	Longwall	Furnace	Horse	
K. Hathaway	Hoyt	Wabash	Shaft	Longwall	Furnace	Horse	
Day Bros	Hoyt	Wabash	Shaft	Longwall	Furnace	Horse	
Jas. Spargur	Hoyt	Wabash	Shaft	Longwall	Furnace	Horse	
		Wabash	Shaft	Longwall	Furnace	Horse	
		Wabash	Shaft	Longwall	Furnace	Horse	
		Wabash	Shaft	Longwall	Furnace	Horse	

WARREN COUNTY.

CORPORATION, FIRM OR OPERATOR.	Mine number.	LOCATION OF MINE.	Railroad connections, if any.	Kind of opening.	PLAN OF WORKING MINE.	Means of ventilation.	Kind of hoist.	KIND OF HAULAGE.
Wishman & Cumming.....	3 miles north of Somerset..	Shaft.....	Room and pillar	Furnace	Horse...	In some of the mines pushers are employed, in others the miners push and cage the coal.
Huff & Baber.....	3 miles NE of Somerset...	.....	Shaft.....	Room and pillar	Furnace	Horse...	
Shackley & Bennum.....	2 miles east of Somerset...	.....	Shaft.....	Longwall.....	Furnace	Horse...	
Welch Bros.....	2½ miles east of Somerset..	C., R. I. & P.	Shaft.....	Longwall.....	Furnace	Horse...	
Somerset Coal Co.....	Somerset.....	.....	Shaft.....	Room and pillar	Furnace	Horse...	
King & Turnipseed.....	Somerset.....	.....	Shaft.....	Room and pillar	Furnace	Horse...	
N. D. Bales.....	Milo.....	.....	Shaft.....	Room and pillar	Furnace	Horse...	
S. C. Bryant.....	Milo.....	.....	Shaft.....	Room and pillar	Furnace	Horse...	
L. A. Williams.....	Milo.....	.....	Shaft.....	Room and pillar	Furnace	Horse...	
Ed. Rowley.....	Liberty Center.....	.....	Shaft.....	Room and pillar	Furnace	Horse...	

MINES OPENED AND ABANDONED IN THE LAST TWO YEARS.

MASHASKA COUNTY.

MINES OPENED.	MINES ABANDONED.
American Coal company No. 5. Legal Coal company. Smith Bros. No. 2. Little-Hoover Coal company. Atwood Coal company No. 2. Sennebec Coal company Cleveland Coal company. Lost Creek Fuel company No. 2.	American Coal company No. 2. American Coal company No. 4. Cardiff Coal company. Consolidation Coal company No. 7. Consolidation Coal company No. 8. Atwood Coal company No. 1. Smith Bros. No. 1. D. Howarth.

MARION COUNTY.

O. K. Coal company No. 5. Forest Fuel company. R. Dieleman. McLaughlin & Payne.	O. K. Coal company No. 4. J. H. Reddish.
--	---

KROKUK COUNTY.

Volunteer Coal company. Lambert Bros. Margaret Coal company.	Klondike Coal company. J. M. Olive. Thomas Bros.
--	--

SCOTT COUNTY.

Buchmeier & Carlin No. 2. O. S. Webster. Long. S. S. Sass. T. Langwith	Clintner & Hanlon. Blackwell & Fridley. Buchmeier & Carlin No. 1.
--	---

WARREN COUNTY.

Smith Bros. No. 2. Lang & Turnipseed	
---	--

FATAL ACCIDENTS.

Table showing Fatal Accidents in District No. 2, for the two years ending June 30, 1901.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF DEATH.	MINE WHERE ACCIDENT OCCURRED.	COUNTY.
August 7, 1899	Art Geddes.	Miner	Fall of slate.	American No. 2	Mahaska.
August 15, 1899	Jas. Kalonda.	Miner	Flying coal from shot	Crescent No. 4	Keokuk.
October 21, 1899	Wm. H. Smith.	Miner	Fall of slate.	Garfield	Mahaska.
November 3, 1899	John McKenzie.	Weightman	Falling down shaft.	Cleveland No. 4	Lucas.
December 22, 1899	Rob Gray.	Miner	Fall of slate.	Klondike	Keokuk.
January 9, 1900	I. B. Carpenter	Miner	Fall of slate.	McCollough's	Lucas.
January 25, 1900	John Evans.	Driver	Run over by car	Consolidation No. 8	Mahaska.
February 2, 1900	L. H. McCune.	Miner	Falling down shaft.	York No. 1	Marion.
February 27, 1900	Jas. Graham.	Miner	Falling down shaft.	American No. 5	Mahaska.
June 14, 1900	A. Anderson.	Mine foreman	Run over by tail rope trip	Mahaska C. & M. Co's.	Mahaska.
July 18, 1900	W. Doty.	Miner	Fall of slate.	Kennebec	Mahaska.
August 3, 1900	P. Anisi.	Miner	Fall of boulder.	American No. 5	Lucas.
August 31, 1900	Wm. Whalley.	Miner	Run over by water car	Big Hill	Marion.
September 11, 1900	N. Brandt.	Weightman	Fall of slate.	H. Booth's	Marion.
September 27, 1900	N. T. Cooley.	Miner	Run over by car	Oskaloosa No. 2	Mahaska.
October 17, 1900	L. Guillian.	Driver	Run over by car	Whitebreast No. 28	Mahaska.
November 3, 1900	P. Soltranko	Driver	Run over by car	Consolidation No. 8	Mahaska.
November 21, 1900	W. Turner	Miner	Windy shot.	Lucas and Cleveland	Lucas.
December 14, 1900	J. D. Williams.	Driver	Fall of slate.	Cleveland No. 4	Lucas.
January 5, 1901	Thos. H. Bennett.	Shot firer.	Explosion.	Lost Creek No. 2	Lucas.
January 5, 1901	W. A. Jenkins.	Shot firer.	Explosion.	Garfield	Mahaska.
March 11, 1901	R. Gibbons.	Driver	Run over by car.		
May 20, 1901	L. Williams.	Miner	Fall of slate.		

In District No. 2, for the two years ending June 30, 1901.

DATE OF ACCIDENT	NAME OF INJURED	OCCUPATION	CHARACTER OF INJURY	CAUSE OF INJURY	MINE WHERE ACCIDENT OCCURRED	COUNTY
July 6, 1899	Jos. Sedlock	Miner	Shoulder blade broken	Fall of slate	Klondike	Mahaska.
July 17, 1899	K. W. Maffin	Miner	Head and face bruised	Fall of slate	Oskaloosa Fuel Co.	Mahaska.
January 8, 1900	John Paul	Miner	Face and hands burned	Blown-out shot	Kennebec	Mahaska.
January 8, 1900	John Bell	Miner	Face and hands burned	Blown-out shot	Kennebec	Mahaska.
February 2, 1900	F. Rosprim	Miner	Leg and arm broken	Fall of slate	Cleveland No. 4	Lucas.
February 14, 1900	John Adams	Miner	Rib broken	Fall of slate	Iowa Fuel Co.	Mahaska.
March, 1900	Jos. Hoeler	Timberman	Knee injured	Fall of slate	O. K. No. 4	Marion.
March 24, 1900	H. Wilson	Driver	Both legs broken	Run over by car	Iowa Fuel Co.	Mahaska.
April 19, 1900	S. Evans	Trapper	Bruised about hips and abdomen	Caught by car	Whitebreast No. 28	Mahaska.
May 1, 1900	P. O'Connell	Miner	Back injured	Fall of slate	American No. 5	Mahaska.
June 15, 1900	P. Renmark	Miner	Two ribs broken	Fall of slate	Columbian	Keokuk.
June 16, 1900	E. Brown	Miner	Hip dislocated	Fall of coal	Iowa Fuel Co.	Mahaska.
June 20, 1900	E. Lehigh	Miner	Back and hips bruised	Fall of slate	T. J. Hayes	Marion.
August 21, 1900	J. Barber	Miner	Leg broken	Run over by car	Cleveland No. 4	Lucas.
August 23, 1900	A. Guilliman	Miner	Leg broken	Fall of coal	Osk. C. & M. Co. No. 2	Mahaska.
September, 1900	R. Jones	Driver	Knee dislocated	Fall of slate	Forest Fuel Co.	Marion.
November 5, 1900	R. Baldwin	Miner	Cut and bruised	Caught between cars	Crescent	Keokuk.
November 10, 1900	V. Manilla	Miner	Foot crushed	Fall of slate	Donley	Marion.
November 12, 1900	A. Thompson	Miner	Foot crushed	Fall of slate	Donley	Marion.
November 21, 1900	K. Kramer	Miner	Hip dislocated	Fall of slate	Garfield	Mahaska.
December 1, 1900	Thos. Hyde	Miner	Face and head injured	Flying coal from shot	Columbian	Keokuk.
December 23, 1900	Bard	Miner	Leg broken	Fall of coal	Huff & Baber	Warren.
January 6, 1901	B. Anderson	Miner	Hand crushed	Fall of slate	Donley	Marion.
January 18, 1901	B. Whacker	Miner	Leg broken	Fall of slate	Garfield	Mahaska.
February 7, 1901	B. Hartshorn	Miner	Breast bruised, head cut	Fall of slate	Big Hill	Lucas.
March 12, 1901	Belfel	Cager	Foot injured	Run over by car	Big Hill	Lucas.
March 16, 1901	Jacob Luke	Driver	Left ankle fractured	Run over by car	Cleveland No. 4	Lucas.
March 22, 1901	D. Eagan	Miner	Three fingers crushed	Fall of coal	Crescent	Keokuk.
March 23, 1901	D. Hayes	Driver	Arm broken	Caught between car and timber	T. J. Hayes	Marion.
March 26, 1901	S. Parlett	Driver	Toes crushed	Run over by empty car	Wild Rose	Marion.
April 26, 1901	D. Kelgel	Superintendent	Rib broken	Thrown under car	Regal	Mahaska.
May 24, 1901	J. Rickabaugh	Miner	External injuries	Struck by flying coal	Forest Fuel Co.	Marion.
May 24, 1901	J. Mooman	Miner	External injuries	Struck by flying coal	Forest Fuel Co.	Marion.
June 5, 1901	A. Pointer	Miner	Arm fractured	Jumping from runaway trip	Whitebreast No. 28	Mahaska.
June 5, 1901	M. Serottinck	Miner	External injuries	Jumping from runaway trip	Whitebreast No. 28	Mahaska.
June 5, 1901	Stilwell	Miner	Hand crushed	Caught between car and timber	Donley No. 1	Marion.
June 11, 1901	D. Clark	Foreman	Two ribs broken	Fall of slate	Lucas & Cleveland	Lucas.

*Fatal and non-fatal accidents from July 1, 1899 to June 30, 1901,
tion to tonnage and number of employes.*

COUNTY.	NUMBER OF ACCIDENTS.		NUMBER OF TONS OF COAL PRODUCED.	TONS OF COAL PRODUCED FOR EACH ACCIDENT.		No. of employes.
	Fatal.	Non-fatal.		Fatal.	Non-fatal.	
Mabaska	12	15	2,308,426	192,369	153,500	2,261
Keokuk	2	4	561,490	280,745	140,373	572
Lucas	6	6	382,999	63,833	63,833	482
Marion	3	11	432,175	144,058	39,289	509
Scott			42,119			85
Adams			34,751			130
Warren		1	38,377		38,377	71
Total	23	37	3,800,337	165,232	102,704	4,110

The number of fatal accidents in the last two years has been exceptionally large. It is a difficult matter to account satisfactorily for this increase, especially where we must concede that fair efforts have been made by the operators in a general way to promote the safe working of their mines, that the mines themselves have not become more dangerous, and that the work performed in them has not been of more hazardous nature than it was two, three, or more years ago. In talking over this feature of accidents with some parties interested in mining, the claim was made, that to some extent the shortening of the working day in the mines from ten to eight hours was responsible for the increase of fatalities. They referred to arguments and statistics used during a recent session of the British Parliament by the opponents of a bill pending before that body to legalize the eight-hour day in all the mines of Great Britain. Their main argument, however, was that the miners, eager to make about the same wage for the shorter workday, that they had made for the longer one, would give too much attention to the getting of the coal and take risks they would not have taken had they more time at their disposal to do their work properly. Taking this argument together with the bare fact that more accidents occurred in this district during the last biennial period and under the eight-hour day than during any like period, when the mines were running ten hours, seemingly makes it appear that there might be considerable truth in their assertion; but an analysis of the accidents themselves and their causes shows that their position is not tenable, and that there is absolutely no proof that the shortening of the workday had anything to do with the increase of accidents.

It may look to the casual observer that a reduction in the hours of labor per day should also result in a reduction of accidents incidental to the performance of such labor. This seems a reasonable conclusion, but there are reasons why it may not prove correct as far as the mining business of this district is concerned. The shorter workday does not lessen the dangers attendant to travel to and from the working face, and it does not in any manner decrease the danger on account of the blasting; it may necessitate the employment of a greater number of men to get out about the same amount of coal that was produced under the old system, or, if the working force is not increased, the mines may be operated a greater number of days. But, even if it is questionable that the shorter workday has brought with it an increased measure of safety, the proposition to consider it an additional source of danger cannot be regarded seriously and of weight, because it is opposed to reason and to fact.

By placing the fatal accidents of the last two years in groups, we find that six were caused directly or indirectly through the use of powder for blasting purposes, eight occurred on the haulage roads or while the deceased were handling cars, and eight were due to falls of roof near or at the working face.

Three of the deaths due to blasting were caused by carelessness on the part of the men killed, but as to the other three men, who lost their lives on the same account, no charge of carelessness or recklessness can be made. Three of the accidents occurred where the powder was ignited by squibs, and the other three, where fuse was used for that purpose. It is still a much debated question in this district as to whether the squib or fuse is the safer use. The facts developed in two of the above cases indicate that had the

men used fuse instead of squibs, they would not have lost their lives in the manner they did. In two of the three cases where the powder was fired by fuse, there is nothing to show that the use of fuse was in any way responsible for the men's death, and in the third case it was foolhardiness and thoughtlessness that caused the accident. The man had been in the habit of firing his shots with fuse, but instead of lighting them at the same time he would first light one, and after that had gone, would go back and light the second. He was warned that such practice was very dangerous, but he persisted. On the day of the accident the fire from the first shot ignited the fuse of the second, and when he arrived at the room face, intending to light it, the charge exploded, and he paid the penalty for his rash act. The objection to the use of fuse seems to be that it permits the miner to fire the holes insufficiently and improperly, making blown-out shots more numerous and more dangerous. There is considerable proof that the objection is an idle one, but it must be admitted that the use of squibs is by no means a sure preventive of blown-out shots and explosions that may result from them, and what greater safety it may afford on this score is more than balanced by the dangers it carries with it in other directions. The fuse may be used with profit when only one shot is fired in a place, but if more shots are required, I believe the fuse is safer, especially if the same care is taken in tamping the holes that is taken when the squib is used.

Five drivers were killed and four more seriously injured in this manner during the last two years. Eighty per cent of the deaths and 75 per cent of the non-fatal accidents were caused by the extremely dangerous practice of riding the tail chain. When one contemplates the daring feats of the drivers as they stand poised on the chain in front of the loaded car, heavily topped with coal, going through the narrow entries at a high rate of speed, where there is but one chance in ten to escape serious injury or death, should the car or the track or the mule stumble, one may well wonder that the list of killed and injured is not a great deal larger. The practice of riding the tail chain should be stopped or else adequate provisions made to make the driver's work less dangerous.

A considerable number of fatal accidents occurring at the work were apparently unforeseen, and could not well be guarded against, but there were some that might have been avoided, had a little more care been exercised. It has been truly said that there is little hope for a substantial reduction in fatalities, until a sense of personal care can be instilled into the mind of the miner.

SCALES TESTED.

During the last two years twenty-five scale tests were made. Most of the tests proved the scales to be in good condition and eleven tests showed that adjustment was necessary.

THE MINE FOREMAN LAW.

Since January 1, 1901, the law requiring mine foremen, in mines producing an average daily output of twenty-five tons of coal, to have a State certificate

competency, has been in force. The object of the law is to increase the safety and provide better sanitary conditions in the mines of Iowa by permitting only men to be in charge who have proved themselves qualified, as such qualifications may be determined by examination and investigation, to work them intelligently and safely.

In a general way the law has been well received. There are some, however, who do not regard it in a favorable light. Their claim is that the law discriminates against men of practical experience, who have not had the advantage of the technical training needed to enable them to get a certificate, and who are by virtue of their practical knowledge amply able to manage a mine successfully. I think this is a mistake. Practical experience is a broad and indefinite term. It may mean much, it may mean little, and it is certain that its value cannot be justly measured by the number of years a man has been employed in the mines. No man, who is possessed of the right kind of practical experience and knowledge, such as a mine foreman, must necessarily have to perform his work intelligently and successfully, and need fear that he will not be able to secure a certificate.

One good feature of the law has already become evident. Its enactment has proved an additional incentive to the ambitious miner to supplement his practical knowledge by study. Increased knowledge means better service. I believe it will be to the advantage of the operators to encourage the desire for self-improvement among their men. Some operators have already done so for some time, and the fact that they are still doing it seems evidence enough that they are satisfied with the results obtained.

For various reasons the cost of opening, equipping and working mines in this State is steadily increasing, and fair returns on mining investments depend more than ever on careful and judicious management. Of how much benefit the enactment of the mine foreman law will prove in this connection remains for the future to reveal. In those coal producing States, where similar laws are in force, results in that direction have been satisfactory, and there is no reason to doubt that this will be the case in Iowa.

THE EXPLOSION AT CLEVELAND NO. 4 MINE, AND SOME REMARKS ON "DUST" EXPLOSIONS.

On Saturday, January 5th, 1901, about 4 o'clock P. M. an explosion occurred in No. 4 mine at Cleveland, Ia., in which two shotfirers, T. Bennett and W. A. Jenkins lost their lives. I was immediately notified and on the morning of January 6th, accompanied by a party of miners and the representatives of the company, examined the part of the mine where the explosion had taken place. It was found that the explosion originated at the face of the third East entry on the North side. Three shots had been fired. One of these had worked all right, the second had blown off the "heel" and left about 3½ feet of the hole solid, and the third, which was fired in the break-through just started, had blown the tamping on Friday, been recharged on Saturday, but had again failed to bring down the coal. The face of the entry was about 70 feet ahead of the last break-through. The entry had passed through a small depression, but for the last 25 yards had been going to the rise. The coal at the face was much

charred, indicating that the heat developed must have been exceedingly intense.

At the inquest held in the afternoon of January 6th the following were brought out:

Blasting was done once a day at the end of the shift. During this time nobody was allowed in the mine except the shotfirers, six in number. Four of these fired the shots on the South side and two fired them on the North side. Fuse was used to ignite the powder. The shotfirers examined all holes as to depth etc., before they were charged and had the right to refuse to fire any shot that, in their judgment, was unsafe.

About 4 o'clock P. M. on Saturday, January 5th, the men working around the top of the shaft were startled by a rumbling noise and the appearance of a large cloud of dust and smoke from the mouth of the shaft. The alarm that an explosion had occurred was at once given, and in a few moments a rescuing party composed of D. O. Campbell, Superintendent, John Luke, Mine Foreman, George Wright, W. J. Thomas, and M. Davis were ready to enter the mine. In the mean time the fan, which was always run at a low rate of speed during the time of firing, was stopped. When the rescuing party reached the bottom of the shaft, they were met by the four shotfirers from the South side, who had felt the shock from the explosion and becoming alarmed, had immediately made their way up the shaft. The party re-inforced by the four shotfirers proceeded north through the still strong afterdamp, stopping only to make absolutely necessary repairs, urged on by the hope that they might be in time to find Bennett and Jenkins still alive. When they reached the mouths of the third and fourth East, it became evident that the explosion had occurred in these entries. On the West rib of the Main North and opposite these entries were large heaps of dust and fine coal. Turning east along these entries the stoppings were found in bad shape and the afterdamp very strong. They pushed on, however, and finally found Bennett lying between rooms 9 and 10 on the fourth East entry and Jenkins between rooms 10 and 11. The hope of the rescuers to find these men alive was not to be realized, as both were dead when they reached them. While the bodies and the clothing on them were considerably burned, appearances indicated that it was not the fire, but the initial force of the explosion that had caused their death. Judging from the condition of the bodies death must have been instantaneous. The last inspection of the mine, prior to the explosion, was made on October 30th, 1900. Generally speaking the mine was then found to be in fair condition. The ventilation on the north side was good. The mine is the deepest in the State, the depth of the shaft being 321 feet. It was opened in 1899 and is well equipped in every way. Ventilation is maintained by a force fan, 20 feet in diameter, producing ordinarily about 4,500 feet of air per minute. The mine is free from fire damp. Just one month after this explosion, another occurred in the same locality. It originated in Room 13 on the fourth East entry. Two shots were fired in this room, they worked fairly well, although somewhat overpowdered. The two shotfirers, M. Davis and R. Edwards, were found by the rescuing party in Room 10 on the same entry in an unconscious state. They were soon removed from the damp-laden atmosphere to fresh air and soon recovered.

Naturally the disastrous ending of the first explosion brought about

eling of dread and insecurity on the part of the men employed in No. 4 mine. To remove this feeling, and to devise means to work the mine with greater safety in the future, arrangements were made for a conference between the representatives of the company and a committee chosen by the miners. The parties came together early on Tuesday morning, January 8th, and remained in session all day. They investigated diligently the cause of the explosion, and considered carefully the measures that were suggested as helpful to avert a like disaster hereafter. They agreed to recommend to the miners for adoption such measures, in addition to the already existing rules, as they thought adequate to reduce the danger from shot-firing to a minimum. The miners accepted the recommendations of the conference, and pledged themselves to work in conjunction with the representatives of the company to promote the safe working of the mine in the future. This action did much to remove the feeling of dread and apprehension that was apparent everywhere before the conference was held, and the fact that fourteen volunteers offered their services as shot-firers furnished sufficient evidence to show that confidence had been restored in a remarkable degree. It is true another explosion occurred since in this mine, but that is no proof that the joint action of the representatives of the company and the miners had been barren of satisfactory results.

I believe this conference has been of much practical value. It brought to the men a better realization and understanding of the danger before them, and was the means of uniting them and the representatives of the company in the praiseworthy effort to work intelligently together for better preservation of life and property. The example set by the miners of Cleveland and their employers is certainly worthy to be followed by the miners and operators throughout the state. Co-operation in this direction is a reasonable and feasible way to lessen the number of accidents in the mines; it is the best means of arriving at a better understanding as to their causes and manner of prevention; it divides the responsibility, and will certainly result in the adoption of desirable and beneficial mine regulations and in better and more general observance of them.

Much has been said about the so-called "dust" explosions in non-gaseous mines, and many suggestions have been offered to prevent them, yet notwithstanding all this, explosions of this character are not becoming less frequent and the fearful loss of life caused by them has not been diminished to any appreciable extent. It is a difficult matter to account for this satisfactorily. I believe, however, that the main reason may be found in the fact that the causes of these explosions are not as thoroughly understood as they could be, and that in consequence measures of prevention were adopted in many instances, that proved either faulty or ineffective altogether. I think it can be truly said that all efforts to legislate these explosions out of existence have been ineffective, and that even general laws, intended to regulate shotfiring in mines, have been of doubtful value. On account of the requirement that only the shotfirers be allowed in a mine at firing time, such laws have perhaps prevented great loss of life, but aside from that they have proven so far inadequate to remove the danger itself. The reports from mines, having such laws, show that the work of the men doing the shotfiring is seemingly performed under as hazardous conditions as ever and the number of shotfirers killed each year in this State proves the fact. The

trouble is, there has been too much dependence on the law-making legislature to provide greater safety in the mines and too little individual effort on the part of the miner and operator to do for themselves what they expect others to do for them.

Explosions in non-gaseous mines are said to be caused by the fire blown-out or overcharged shots extracting and igniting the volatile of coal dust, stirred up and suspended in the air within reach of the by the concussion from the firing of such shots. Most writers on the subject enlarge especially on the danger of the presence of *dry* coal dust. The claim is made that blown-out or overcharged shots will prove harmless if the dust in the vicinity of the shots fired is kept in a damp condition. Some even say that the watering of the roadways alone will effectually remove the danger. Mr. Pamelly says on this point: "Roadways should be systematically watered so as to damp the dust, and thus render it harmless." Hughes makes this statement: "It may now be regarded as established that small amounts of moisture are sufficient to prevent the possibility of coal dust being ignited, and at many collieries the main roads are regularly watered." I believe that the sprinkling of dusty roadways has a beneficial effect, it may afford some protection and it is certainly to be commended as a sanitary measure, but I think the above named gentlemen carry it too much in this respect. If their views, that damp roadways are an adequate protection against explosions in non-gaseous mines, are correct, a large number of explosions, where this condition existed in a marked degree, should have occurred. But they occurred, nevertheless, and damp roadways apparently did not even mitigate their severity and destructiveness. I mention only one instance. Some years ago, the owners of the mine at New Castle, Col., realizing that the easy inflammability of coal dust in that mine required extra precautions, concluded to install an elaborate sprinkling system, that would keep the mine at all times in a thoroughly damp condition. Along the entries pipes were laid, perforated in such a manner that the water forced out under considerable pressure in fine jets moistened not only the bottom of the entries, but sides and roof. The owners did not stop with only keeping the entries damp. At the end of each room was a suitable arrangement to attach to the main pipe, long enough to reach the room face, and before a miner was allowed to fire a shot in his room, it had to be thoroughly wetted down. The dampening of the dust furnishes an unfailing prevention of explosions. It should have proved its effectiveness in this case. The fact is, the explosion which occurred in this mine, was a most disastrous one. Every man in the mine was killed and the mine itself almost destroyed by its force. The mine at the time of the explosion was of comparatively small extent and was well ventilated, between 54,000 and 60,000 cubic feet of air passing into the mine every minute.

Is it not strange, with such example before us, that of all the mining experts, I have looked up on the question of coal dust, there is not one (Coal and Metal Miners Pocketbook, 6th ed.,) that gives warning against "too much faith must not be placed in the use of water by sprinkling to lay the dust." When evolving theories regarding these explosions seems well to consider carefully all the conditions and details about them as far as they can be established by close investigation. Taking the

plosion in Cleveland No. 4 as an example, the initial force developed must have been very great, for only a short distance from the starting point the explosion large rocks, some of them weighing several hundred pounds, had been picked up and carried quite a distance. In the Pekay explosion in 1892 chunks of fire clay were uprooted and thrown against the wall and roof in such manner as to give that part of the mine the appearance of having been whitewashed in spots. The advocates of the sprinkling system claim that their method is safe, because the dampness of the dust will prevent it from rising into the path of the flame. This would perhaps be true if the display of force accompanying or rather preceding the flames could be eliminated, but I submit that, if the force developed can dig up the clay and toss large rocks about, it can surely elevate and separate from each other the damp particles of coal dust and hold them in suspension long enough for the flames to reach them and distill and ignite the gases they contain. It may require a greater initial degree of heat than if the dust was in a dry and finely divided state, and in all probability, if the mine is naturally damp all over, the scope of the explosion may be limited to some extent, yet there seems to be no ground for assurance that an explosion under these apparently unfavorable conditions may not be as disastrous as one occurring in a perfectly dry mine.

I do not like the term "dust explosion." The term, in my opinion, is confusing, it obscures the real cause, it leads one to attach too much importance to the dust and tends to detract attention from other features that in all probability have a great deal more to do with bringing an explosion about than the dust itself. I have no intention to belittle the influence of the dust in extending and magnifying the force of an explosion already under way, but I believe it is wrong to assign the presence of coal dust as the main cause of it.

There are no data as to the amount of dust that must be ignited to carry an explosion started by blown-out or overcharged shots. I believe, however, the amount of dust needed is comparatively small, and considerably less than is generally supposed. The claim made by many, that the greater the amount of dust present, the greater the severity of an explosion, appears to be not in keeping with the facts. We know that excessive use of fuel in firing a boiler results in a lower degree of heat in the fire-box and a consequent lessening of the steam producing power. Now, I will not go so far as to say that an excessive supply of coal dust to the advancing flame of an explosion will weaken the explosion, but I believe I have reason and facts on my side, when I state that such excessive supply cannot in any way add to its power. Only a certain quantity of dust, varying according to conditions in each case, can be effectively ignited by the flames of an explosion, and in my judgment, the mine containing just enough dust to supply the flames of an explosion all it can readily consume is at least fully as dangerous as the mine with larger accumulations of dust, provided, of course, that other conditions are identical. It appears to be not a question as to the amount of fuel available, but as to how much of it can be used under the circumstances with the greatest possible effect.

Some years ago several governments in Europe appointed commissions to investigate and establish the cause of these explosions. These commissions did a large amount of experimental work and their experiments

proved of considerable value to all interested in mining, but as the experiment was principally conducted with the view to establish the dangerous character of the coal dust in the presence of heat and flame from blown-out or charged shots, other features brought out by them did not attract the attention they deserved, and in consequence of that fact the deductions made were not always as complete and exact as they might have been had these features received more careful consideration. There is an ample excuse for this, however, for it must be remembered that the experiments were necessarily conducted under conditions that differed materially in many respects from those existing in an actual mine, and it could not be expected that absolutely correct deductions would be possible under such circumstances.

As an illustration of the manner of conducting these experiments for reaching conclusions from results obtained, the following furnishes an interesting and valuable example. The experiment and investigation was conducted by Messrs. Hall and Clark of England. It was carried on in a slant thirty square feet sectional area, arched with brickwork and driven from the surface a distance of forty-five yards. The charge of powder was fired from a strong iron tube, two feet long and two and one-half inches in diameter. This is their description of the experiment and its results: "Coal dust having been scattered the whole length of the slant, the dust being very wet, fired two and one-half pounds of powder. In this experiment the flame issued strongly at the mouth of the slant, having traveled forty-five yards. The blast was very fierce, and would certainly have proved fatal to anyone struck by it in its course. It was noticeable in this experiment that not only was the flame largely increased, but the blast was also proportionately greater, and bearing in mind that the floor of the slant was wet (dripping), and the temperature low (50 degrees), we may fairly assume that in dry mines at a high temperature and where the roads are covered with fine dust, this dust will play a considerable part in extending and adding to the destructiveness of an explosion."

The experiment was conducted under ideal conditions and brought out the essential component parts of the cause of an explosion in a non-gaseous mine. The investigators, however, did not at the time take into account the importance of all these factors, in fact for years very little attention was paid to some of them and the opinion prevailed for a long time, that a certain amount of coal dust was necessary to cause an explosion, in the absence of firedamp, was of coal dust and the intense heat and flame produced by blown-out or charged shots.

Here are the conditions as we find them to exist at Mr. Hall's experiment:

1. We have the heat and flame from the equivalent of a blown-out shot.
2. We know that the ventilation of the slope was of such a character as to insure pure air in all parts of it.
3. We note the presence of coal dust (its state with regard to wetness or dryness not well defined).
4. We find that the slope was a place of small dimensions, affording little expansion room for the heated air and gases.
5. We find that the temperature was low (50 degrees).
6. We find that the course of the explosion was an ascending one.

Mr. Hall says the result of the experiment was a very violent blast, that would certainly have proved fatal to any one struck by it in its course.

A careful comparison of the conditions surrounding the experiment with the conditions, as investigation has proved them to exist at actual "dust" explosions, reveals a remarkable sameness, that warrants the conclusion that these conditions are essential in bringing about an explosion and further, that the four first named and generally the fifth must all be present to make each explosion assume dangerous proportions.

We may therefore state that the following are the essential factors of a dust explosion: 1. Intense heat and flame from blown-out or overcharged shots, or from shots fired in rapid succession in the same working place. 2. Good ventilation. 3. Coal dust (not necessarily very dry nor present in very large quantities. 4. Limited expansion room for the heated air and gases in the neighborhood of blown-out or overcharged shots. In addition to these factors there is another, that should be considered a prime factor, but which to be on the safe side, I shall call an auxiliary factor or a factor having a decided influence in increasing the severity and extent of an explosion, and that is a low mine temperature prevailing at the time of an explosion in the territory affected by it.

The fact that good ventilation is necessary to make a "dust" explosion possible, seems to be fully established, and it is so well known now, that there is little occasion to say anything further on this point. Good ventilation is the vitalizing agent of an explosion; without a plentiful supply of fresh air near its origin, it will die in its incipency.

Investigation as to in what mines or in what parts of a mine these "dust" explosions are most likely to occur shows conclusively that they either originated in new mines of limited extent, or, if in older mines, in the newer and more congested workings. The more room there is provided for the rapid expansion and dissipation of the heated gases in the vicinity of blown-out or overcharged shots, the more remote will the possibility of a "dust" explosion become. It seems that the heat must first be confined to narrow channels to give the forming explosion the necessary impetus to project itself through the whole or a considerable portion of a mine.

The influence of a low mine temperature in assisting the formation and extension of "dust" explosion is so marked, that it should receive special attention. In the earlier investigations of these explosions, it appears, that temperature was deemed of small importance and received very little attention. Mr. Hall, in commenting on the results of his experiment, did take account the state of temperature, but he evidently made a mistake, when he considered low temperature a check to these explosions rather than a help, for nearly all these so-called "dust" explosions have occurred during the colder months of the year and, so far as I know, there is no record of an explosion, caused by a blown-out shot, having occurred in a non-gaseous mine during the months of July and August. Admitting that most mines have a greater degree of dampness in the summer than in the winter and that in consequence the safety of the mines is thus increased somewhat, yet, as we have seen that dampness alone is not a reliable preventive of explosions, there must be other reasons why "dust" explosions are of such rare occurrence during the summer. We know that the supply of oxygen, under like conditions, is less in a mine during the summer than in the winter; we also know that natural ventilation, which plays a very important part in the winter time in supplying the workings adjacent to the main air

channels with fresh air, is almost altogether absent in the summer all these conditions, affecting more or less unfavorably the formation of "dust" explosion, are brought about by the same cause, viz. high temperature of the air entering a mine, and therefore high temperature might be regarded as a far more reliable preventive of "dust" explosion than dampening the dust by sprinkling. On the other hand, a current of low temperature entering a mine constitutes a powerful factor assisting the formation and enlarging the scope and force of such explosion. Good ventilation is essential to a "dust" explosion, and we know that a current of low temperature will ventilate a mine more thoroughly than one of high temperature, other conditions being the same. As the temperature is lowered, the less natural dampness will exist in a mine. It is a fact, that the lower the temperature of an air current flowing through a mine at the time of an explosion, the greater will be the expansion of gas developed under the same conditions. The law that under the same conditions the volume of any gas or air varies as its absolute temperature holds true in application in this case. Supposing that the flaming gases coming from a blown-out shot had a temperature of 2000° F., and that the temperature of the mine air in the vicinity of such shot was 75°, it follows that, as long as the difference in temperature between the flaming gases and the mine air remained the same, the mine air and the other gases, after being heated to a temperature of 2000°, would be expanded to 4.605 times their original volume. If the mine temperature was lowered to 40° F., other conditions remaining the same, the expansion would amount to 4.927 times the original volume. To illustrate the effect: With an original temperature of 75° F. the territory traversed by an explosion, the increase in the volume of gas contained in an entry, 40 square in area, would be for every hundred feet of its length nearly 1300 cubic feet greater than if the temperature at the time of the explosion had been 75°. It needs no argument to show the direct effect of such increased expansion.

The explosions which occurred in No. 4 mine, Cleveland, Iowa, on January 5th and February 5th, 1901, respectively, furnish the rare opportunity for observing the actions and effects of two explosions originating at the same place and extending over the same territory. The explosion of the 5th of January originated at the face of the third east entry on the north side, the explosion of the 5th of February started in room 13 on the fourth east entry, less than fifty yards distant from the seat of the first explosion. Both explosions extended through the third and fourth east entries to the main north and along this entry to the hoisting shaft, and through it to the surface. Not only as to the place of origin and the territory affected were these explosions decidedly similar; the manner of spreading was the same, the amount of air entering the mine was about the same in each case and there was no perceptible difference in the conditions of the entries as to the dampness and the amount of dust present.

There was this difference, however: The amount of powder consumed in the three shots fired in the third east entry was probably twice as much as the amount used for the two shots fired in room 13 on the fourth east entry. Two of the holes in the third east were tight ones, while the holes in room 13 were fair holes that did the work intended for them to do, although some of them had too much powder. With this fact before us, it was not

at all to find that the heat developed at the starting point of the first explosion was very intense and the display of force there very great, while the second explosion left scarcely any signs of great heat and created no unusual disturbance, either in room 13 on the fourth east or its immediate vicinity, and it would seem that, under these circumstances, the conclusion would have been justified that the first explosion would at least maintain its prior degree of violence all the way through. But this proved not to be the case, for strange as it may seem it lost considerable of its initial force in traveling to the shaft, while the second explosion gained force and became more destructive on its way out. It ejected a larger volume of smoke and gas from the hoisting shaft than the first one and demolished stoppings and timbers along the main north that the first explosion had failed to damage, and how can we account for this? The physical condition of the mine in the immediate vicinity of the starting points of these explosions had probably no influence, but the fact that these starting points were less than fifty feet apart suggests that some other influential cause must have been at work to bring out the second explosion's extraordinary development of force. I submit that this cause was the very low temperature prevailing on the day of the second explosion. Mr. S. H. Mallory of Chariton (the county seat of Lucas county, where these explosions occurred) has kindly furnished me a copy of his meteorological records for the months of January and February, 1901, and according to these records the mean temperature on the day of the first explosion, January 5th, was 27.5° , and on the day of the second explosion, February 5th, 5.5° . It was therefore twenty-two degrees colder on the last named date. Of course the above readings refer to outside temperature only, but there is little doubt, in this case, at least, that any increase or decrease in the outside temperature would manifest itself in a proportionate degree in that part of the mine where the explosions occurred. I have already called attention to the influence of temperature on "dust" explosions and the comparison of the two explosions in the Cleveland mine, occurring as they did, under almost identical conditions, seems to sustain the views I have expressed on that point. There is nothing very mysterious or unexplainable in these "dust" explosions. They are not due to agencies beyond the control of man. Much has been said as to how they may be prevented, but the greatest safeguard any mine rests in the ability of the management and the miners employed therein to understand thoroughly the nature of the danger they may have to deal with. When that is accomplished it will prove a comparatively easy task to devise adequate means to eliminate that danger, or at least minimize it to the utmost.

TABLE No. 4.

List of corporations, firms, and individuals operating mines in the district, their post office address and shipping facilities, if any.

MAHASKA COUNTY.

CORPORATION, FIRM OR INDIVIDUAL.	POST OFFICE ADDRESS.	SHIPPING FACILITIES.
Consolidation Coal Co.....	Muchakinock	Chicago & Northwest
Klondyke Coal Co	Oskaloosa	Chicago & Northwest
Kennebec Coal Company	Muchakinock	Chicago & Northwest
Lost Creek Fuel Co.....	Lost Creek	Chicago & Northwest
Regal Coal Co.....	Oskaloosa	Chicago & Northwest
Iowa Fuel Co.....	Oskaloosa	Chicago & Northwest
Mahaska Coal and Mining Co.....	Oskaloosa	Chicago & Northwest
Atwood Coal Co.....	What Cheer.....	Chicago & Northwest
Eveland Coal Co.....	Eveland	Chicago & Northwest
American Coal Co	Evans	Rock Island.
Oskaloosa Coal and Mining Co	Oskaloosa	Rock Island.
Garfield Coal Co.....	Beacon	Rock Island.
Little-Hoover Coal Co.....	Oskaloosa	Rock Island.
Richard Bros	Evans	Rock Island.
Wm. Patterson	Leighton	Rock Island.
Whitebreast fuel Co., of Illinois.....	Ottumwa	Iowa Central.
Sowden Coal Co.....	Beacon	Burlington & Western
Smith Bros.....	Oskaloosa	Local.
G. Clough.....	Oskaloosa	Local.
Barrowman & Oakley.....	Oskaloosa	Local.
Fred Schultz	Oskaloosa	Local.
J. Baxter	Oskaloosa	Local.
Geo. Cook	Oskaloosa	Local.
Oskaloosa Fuel Co.....	Oskaloosa	Local.
Evans Coal Co.....	New Sharon	Local.
W. F. Williams	New Sharon	Local.
John Madison	Beacon	Local.
F. D. Coryell & Son	Eddyville	Local.
Jas. Staley	Harvey	Local.
Frey Bros.....	Leighton	Local.
M. Carey.....	Rose Hill..	Local.

MARION COUNTY.

Donley Coal Co.....	Hamilton	Wabash.
Wild Rose Coal and Mining Co.	Des Moines.....	Wabash.
O. K. Coal Co.....	Bussey	Wabash and C. B. & O.
Hawkeye Coal Co.....	Flagler	Chicago, Burlington & Northern
S. R. Rollings	Flagler	Chicago, Burlington & Northern
Hamilton Coal Co	Hamilton	Chicago, Burlington & Northern
Ennis & Stillwell	Hamilton	Chicago, Burlington & Northern
Dunreath Coal Co	Des Moines.....	Wabash.
Forest Fuel Co	Otley	Chicago, Rock Island
McCroskey & Co	Otley	Chicago, Rock Island
Yukon Coal Co	Otley	Chicago, Rock Island
Roberts & Young	Otley	Chicago, Rock Island
H. Booth	Knoxville	Local.
J. T. Hayes	Knoxville	Local.
Theo. Johnson.....	Bussey	Local.
Wm. Pace & Co.....	Otley	Local.
Union Coal Co	Pella	Local.
J. R. Dieleman	Pella	Local.
Geo. Davis	Hamilton	Local.

KEOKUK COUNTY.

CORPORATION, FIRM OR INDIVIDUAL.	POST OFFICE ADDRESS.	SHIPPING FACILITIES.
Anteer Coal Co.	What Cheer	Burl., Cedar Rapids & Northern
Burgaret Coal Co.	What Cheer	Burl., Cedar Rapids & Northern
Ham Blatt	What Cheer	Burl., Cedar Rapids & Northern
Escent Coal Co.	What Cheer	Chicago & North-Western.
umbian Coal Co.	What Cheer	Chicago & North-Western.
mmerrin & Son	What Cheer	Chicago & North-Western.
nhert Bros.	What Cheer	Chicago & North-Western.
ter Bros.	What Cheer	Chicago & North-Western.
ldgings Bros.	What Cheer	Local.
Murray	What Cheer	Local.
Peacock	What Cheer	Local.
Armstrong	What Cheer	Local.
Mason	What Cheer	Local.
Fisher	Delta	Chicago Rock Island & Pacific.
W. Allsup	Delta	Local.
and Teeters	Delta	Local.

LUCAS COUNTY.

Whitebreast Fuel company of Illinois	Cleveland and Ottumwa	Chicago, Burlington & Quincy.
Hill Coal Co.	Lucas	Chicago, Burlington & Quincy.
ucas and Cleveland Coal Co.	Lucas	Chicago, Burlington & Quincy.

ADAMS COUNTY.

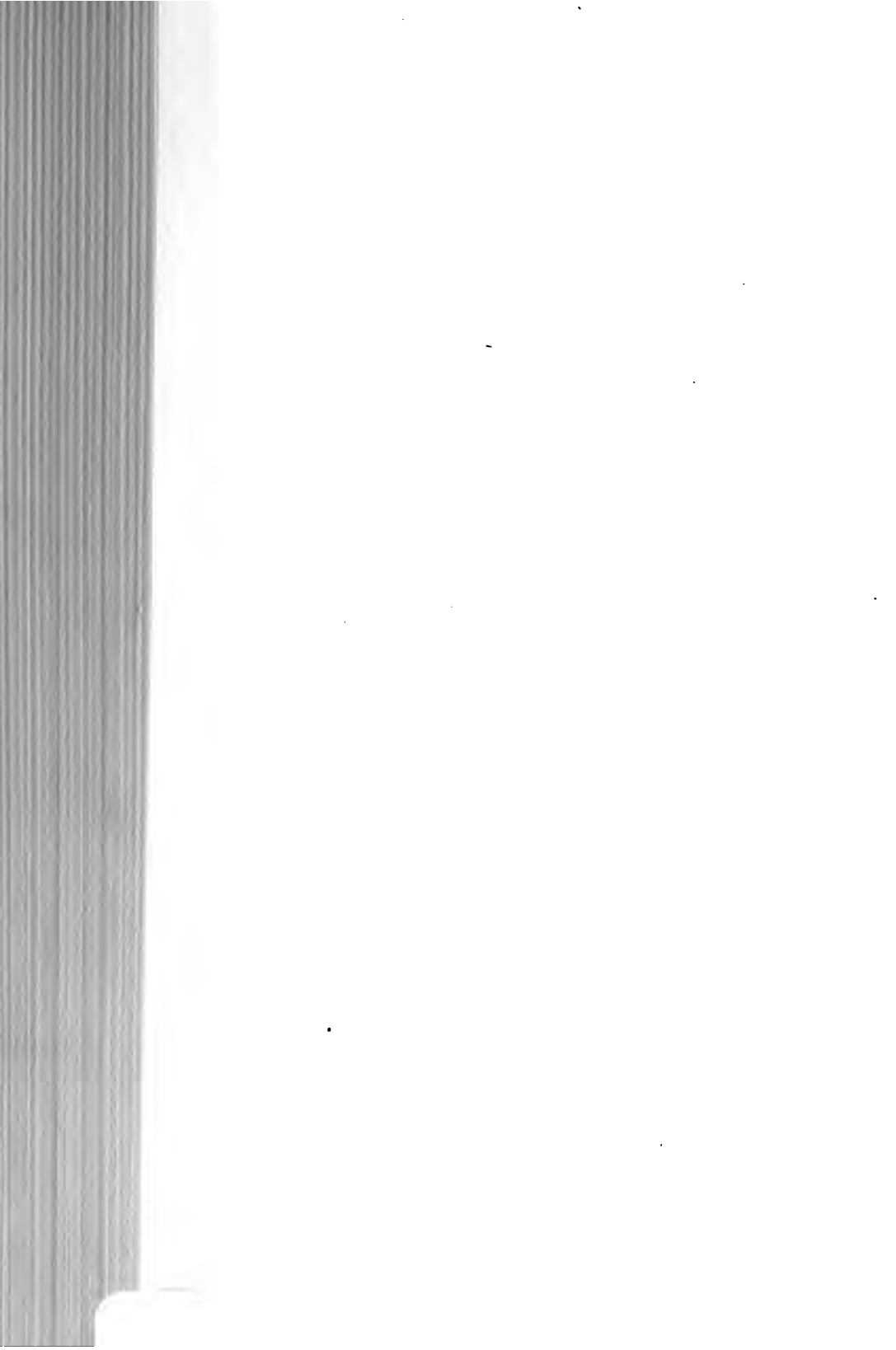
M. Henton	Eureka	Local.
Amdor	Eureka	Local.
R. Miller	Briscoe	Local.
W. Powley	Briscoe	Local.
ce & Collins	Carbon	Local.
S. Wheeler	Carbon	Local.
nn Ruth	Carbon	Local.
es & Perks	Carbon	Local.
McKee	Carbon	Local.
Jones	Carbon	Local.
Gebbie	Carbon	Local.
O. Trowbridge	Carbon	Local.
F. Wilds	Carbon	Local.
Hathaway	Hoyt	Local.
ny Bros.	Hoyt	Local.
S. Spargur	Hoyt	Local.

WARREN COUNTY.

Somerset Coal Co.	Somerset	Chicago, Rock Island & Pacific.
ng & Turnipseed	Somerset	Chicago, Rock Island & Pacific.
ackey & Bennum	Somerset	Local.
elch Bros.	Somerset	Local.
ishman & Cumming	Somerset	Local.
ff & Baber	Carlisle	Local.
D. Bales	Milo	Local.
C. Bryant	Milo	Local.
A. Williams	Milo	Local.
Rowley	Liberty Center	Local.

SCOTT COUNTY.

McDonald	Jamestown	Local.
tzger & Kancher	Jamestown	Local.
Long	Jamestown	Local.
chmeyer & Carlin	Jamestown	Local.
as. Sass	Jamestown	Local.
T. Langwith	Jamestown	Local.
eo. Kautz	Buffalo	Local.
os Webster	Buffalo	Local.
McCollough	Buffalo	Local.



BIENNIAL REPORT
OF THE
THIRD DISTRICT,

EMBRACING

dair, Boone, Dallas, Greene, Guthrie, Jasper, Polk, Story,
and Webster Counties.

JAMES W. MILLER, INSPECTOR.

LETTER OF TRANSMITTAL.

To the Hon. L. M. Shaw, Governor of Iowa:

SIR.—As inspector for the third mining district, I have the honor to present, herewith, the biennial report for the above district, which report contains the usual tabulated statements relative to the production of coal, improvements, casualties, and such other information as I deemed of importance to the mining interest.

Respectfully,

J. W. MILLER.

REPORT OF THIRD DISTRICT.

The condition of the coal business has been very satisfactory during the past biennial period, ending June 30, 1901, for the demand has been good and prices have averaged much better than in former years. Miners have been benefited by the decrease in hours, as eight hours constitute a day's work around all the mines in this district; mining price has been advanced, also top wages, and in a number of instances wages for underground day work have met an advance. It is also noticeable that a kindly feeling seems to prevail throughout the various mines between the officials and employes. The state meetings called yearly by the operators and miners to talk over and adjust the scale of prices for mining, day work, bruising and all other questions pertaining to the mining business, has met with universal satisfaction. There is an executive board elected by the operators and by the miners to act as an arbitration board to decide the various questions that come up, from time to time, between the companies and their men, which has saved a great deal of the unpleasant feeling that formerly existed during the adjusting of differences between mine officials and their men. This all tends to show that the interests of employer and employe are being appreciated by both alike, and thus they should be; for the successful operation of a mining plant means a good investment for the company and likewise a good investment to the miners for the time spent therein.

I am pleased to state that my official duties between operators and miners have been very agreeable and satisfactory to me. And I wish to thank the officials of both operators and miners for the help rendered me and the interest they have taken in bringing about and securing the present very gratifying conditions of our mines, for the same is beneficial to all concerned. During the past year the mines, as a rule were found to be in better condition, from every point of view. There are several reasons for this; one is business and prices have been better, which all tends toward successful operations. Also evidence of a willing spirit to faithfully comply with the requirements of our mining laws has been shown, which greatly aids an inspector in carrying out the intent of the law.

This, the third inspection district, comprises the following counties: Polk, Boone, Webster, Jasper, Dallas, Green, Guthrie, Story and Adair. There are about one hundred and twenty-six mines in the nine counties, and are classed as follows: Fifty-four doing an exclusive shipping business; twenty sell most of their product to local trade, but load some coal on cars; while fifty-two are operated for local trade only. There are within the district fifty-seven mines equipped with steam plants for hoisting purposes. The balance use horse or mule power, whichever is best adapted. At different small local mines they have gasoline equipments for pumping

water and running fans, which seems to give good results, and save expense of placing boilers and possibly the using of poor boiler water. Very few of the mines coming under the jurisdiction of the inspector have furnace ventilation, for that method is expensive, inconvenient and liable.

There were quite a number of good and substantial improvements during the past biennial period. Companies have enlarged their ventilation machinery, remodeled their pit heads and top equipments, and purchased better hoisting appliances to handle their increased output. Also several new shafts were put down, which were equipped with modern improved machinery and fitted up with labor-saving devices.

A WORD ON VENTILATION.

The Inspector finds the matter of ventilation one of the most important features connected with his official duties, as the health of those who work underground depends largely on the condition of the air they breathe. The conditions governing the ventilation of the mines are changing constantly and require constant attention and careful supervision from the mine manager or man to keep the mine in proper condition.

The mining business, of this State, has reached the point that a manager or mine foreman cannot expose his incompetency in any better way than to have within his employ, and continue to have, a poorly ventilated or undisciplined mine. For, regardless of what conditions may exist, a practical and competent mine foreman will, in time, figure ahead on laying out of his underground workings to such an extent as to take advantage of emergencies that he may come in contact with; and by so doing avoid delays, extra expense, and uncalled for grievances; which all tend to reduce the cost of his products when landed on the tippie, and is furthermore a benefit to the investors, producers, and all concerned.

The miners are greatly interested in good ventilation, and, as they spend a good portion of their time at the face underground, it is very essential that they should be. Yet, it is a common occurrence to find a room too small and driven in twenty to twenty-five yards without a break-through, and expect the same to be properly ventilated. This sometimes is the fault of the miners themselves, who in their eagerness to make money neglect to take the proper precaution to care for and ventilate the working places. More often the neglect of the operator, who does not want to pay the expense incurred in making the necessary break-throughs, to allow the free current of air to reach the working faces. Also, very often after a break-through has been made, there is fifty per cent of it filled up with draw-props, tool-boxes, or some kind of refuse, which all act as an obstruction to retard the air and reduce the quantity. In fact, many yards of entry and air-ways, could be saved by having the same made a proper size and cared for after it had been driven. Air traveling along an air-way of proper size, through break-throughs free from obstructions, means a great deal toward good ventilation. And to obtain this it is only necessary for the employees working below to work to each other's interests.

The air traveling down one shaft, and along through the air-con-

returning to the up-cast shaft, having only partially traveled along the faces, where the men are at work, it is not proper ventilation by any means. To properly ventilate a mine, first have ventilating machinery and fan of sufficient capacity to handle 30 per cent more air than the law calls for, air-shaft, air-courses, and break-throughs made plenty large enough to admit a volume of air of sufficient quantity with the least possible resistance to the same. The use of over or under-casts are also of great benefit. By giving to each pair of entries a separate current of air, you decrease the friction, increase the quantity of air, and avoid the powder-smoke and impurities from other entries; also lessen the danger should an explosion occur, for there would be less men to come in contact with it.

Regarding the splitting of air, there is, of course, a limit. The volume of air should not be reduced below a speed and quantity that will mix and remove the impurities from the working faces. The speed or velocity of the air depends on the size of the air-ways. They should, of course, always be large enough to permit a sufficient quantity of air to travel at a reasonable velocity. The best law to govern a mine foreman on this question is to have air enough to remove all obnoxious gases from the working places and replace the same with fresh air. To do this he will have large air-courses; divide his volume; place good substantial doors between entries; keep his unused break-thoughts bratticed up tight, and those that are in use free from obstructions, such as tool-boxes, timber, loose slate, and rubbish; and carry his air up through the last open break-throughs where men are at work.

MINE FOREMAN'S LAW.

During the session of the legislature of 1900, there was a law passed which took effect January 1, 1901, requiring all mine foremen and hoisting engineers, being employed at mines producing more than twenty-five tons of coal per day, to pass an examination or obtain a certificate for service from the examining board. Said board consists of five members representing the different interests pertaining to mining. Said board began holding sessions, in August, 1901, at the various mining centers, at such periods as they deemed advisable, for the convenience and benefit of all concerned. There has been issued, up to June 30, 1901, 605 mine foremens' and — hoisting engineers' certificates.

In my opinion there has been no piece of legislation enacted in recent years that should be of more benefit to both miners and operators alike than this act to the operators for the reason that it has stimulated the mine foremen and hoisting engineers in their desire for knowledge pertaining to their duties, in order to enable them to pass the examination and receive a certificate, which would enable them to hold their positions if already employed in either capacity, and if not so employed to enable them to secure such a position. This knowledge, on the part of the mine foreman, is always a benefit to the operator or owner of a mine, for the reason that it should enable him to keep his mine well ventilated, and pillars of a proper thickness, and avoid extra yardage on break-throughs. In fact, it will mean a better ventilated mine, and more regard will be paid to the law in reference to health and safety to those employed underground, also a benefit to the

mine foreman himself; as a man with a thorough knowledge of his work can always get a better salary than one who is not so well informed.

I have visited the mines, during the past biennial period, as time and occasion demanded. At these visits I did not always visit various mining plants in strict compliance with the mining laws. I am glad to report that I have always found the officials in charge of the plants ready and willing to make the necessary repairs and improvements suggested as being essential in the preservation of life and health of the miners.

A WORD REGARDING FANS.

In some of our large mines there is not enough attention paid to the movement of the fan; especially during the night. Where there are workings in the various parts of the mine left open, they naturally fill with damp; and unless properly bratticed up, the moment you reduce the air pressure, by opening doors or reducing the speed of the fan, the damp rushes out on the entries and remain there until the pressure and current of air is again resumed; and when the current is increased the damp is carried through the working places. And very often the damp accumulates during the night are not entirely removed from the working places in the mine for several hours after the men start to work in the morning. This should not occur. The pressure should be the same at night as during the day. To do this the fan must be kept at the same speed. It is completely clean the mine of all impurities throughout the working. It requires very little more fuel and attention to keep the fan running at the same speed, and there certainly is a great benefit to be derived by keeping the mine filled with fresh air in the morning when the men go to work.

MAPS OF ABANDONED MINES.

It requires considerable urging, at times, to secure a compliance with the mining law as regards the filing of a map of abandoned mines with the inspector. At times I think that the officials of the various mines do not realize the importance of the same. It is very essential that maps of abandoned mines should be on file, for it affords those having access to the territory valuable information; especially where a mine is filled with damp. To know approximately the extent of such workings, so as to guard against passing through from adjoining territory, is not only a great advantage to the company, but a safeguard to the employees working below.

SCALES.

There was enacted during the Twenty-Second General Assembly a law requiring each mine inspector to procure a set of test weights for the purpose of testing the scales at the various mines used for weighing the

coal. This law is still in vogue without any changes since the enactment of the same.

During the past biennial period nine-tenths of the scales used for weighing miners' coal in the third district have been tested, and some of them several times. The majority have been found deficient, and when found in such condition the company has, in nearly every case, been willing and ready to place the work of adjusting the same in a scale company's hands, to be placed in proper weighing condition as quickly as possible. Still, in some cases, scales were found deficient after being taken out, repaired and replaced. The only reason for such to occur was the incompetency of those attempting to adjust the same, which means not only an additional expense to a company, but delay and annoyance to all concerned.

The inspector finds, in a large majority of cases where he is called on to test the scales at the various mines, that the trouble lies in the dividing of each man's coal. Where a scale-beam does not break quick enough or requires too much weight to show the movement of the same, it is impossible for the weighman to give each man his just dues; and yet, on the other hand, it is possible the aggregate or full car will have been weighed within one hundred and fifty or two hundred pounds either way; showing, in this case, that the weighman has credited the men with all the coal that is due them, but might not have placed on his bulletin the proper weight of each individual car, giving too much weight to one and not enough to another.

This may be caused from a number of reasons: the weather, the contracting and expanding of the extension rods; knives or bearings becoming dull; and foundations settling and becoming uneven, or being bound so that the platform does not work freely.

Allowing locomotives to pass over a scale, or pulling loaded cars back over the same, has cost more money than any one thing in connection with a scale. This should always be avoided if possible.

BAROMETERS.

There are two kinds of barometers, the mercurial barometer and the aneroid barometer. The mercurial barometer measures the variations of the atmospheric pressure, by the raising or the falling of mercury in a glass tube. With the aneroid barometer the pressure of the air is measured without the use of a liquid. The pressure of the atmosphere causes upon the circular metal boxes, which has been nearly exhausted of air and then soldered air-tight. The sides of the box are corrugated in concentric rings, so as to increase their elasticity. Owing to the box being nearly exhausted of air, it becomes extremely sensitive to the changes and different weights of the atmosphere.

WHAT CONNECTION HAS A BAROMETER WITH A PUMP?

A barometer is used to obtain the weight of the atmosphere and the pressure that the same is exerting wherever the barometer may be placed, either

on a high or low point. By knowing the weight of the air per square inch you are enabled to know how far a pump will lift water. The weight of the air varies according to the density of the same. A pump, having the plunger in the water cylinder properly packed, when put in motion creates a vacuum in the cylinder and allows the pressure of the atmosphere, which is pressing down on the surface of the water, to force the column of water up the suction-pipe to a height equal to that of the weight of the air. The mercury used in a mercurial barometer is 13.6 heavier than water, so, if the weight of the air indicates $29\frac{1}{4}$ on the face of the barometer, with a perfect vacuum the water would be forced to a level with the weight of the air, which would be about $33\frac{1}{2}$ feet in height; for 13.6 multiplied by 29.5, divided by 12 inches, which equals one foot, would give 33.4 feet that the water has been lifted by the above pump and pressure.

A barometer is also used in connection with mines, more especially where the mines are giving off explosive gases in sufficient quantities to cause an explosion when mixed with air in adequate proportions. The higher the barometer the less danger of escaping gases within the workings of a mine; for the reason that the air is heavier, causing a greater pressure, and keeping the lighter gases stored up in goves, abandoned workings, crevices, etc. A low barometer indicates less weight, lighter air, and consequently less pressure in the mine; and allows the lighter gases to come out from where they have been pent up and mix with the ventilation or the volume of air.

We do not have marsh-gas, or firedamp, in the mines of Iowa—which is marsh-gas being mixed with air to an explosive point, at which point it becomes firedamp. A barometer placed at the bottom, or top of a shaft at the various mines in this state would be of considerable benefit, for this reason, when there is a low barometer, indicating a lighter air, then, to avoid reducing the quantity of air in a mine, you can increase the speed of the fan, thereby overcoming the decreased atmospheric pressure.

Very often, during a time when the air is moist or foggy, you will hear the men say the air is heavy. By looking at the barometer you will find they are mistaken, for during such weather the air is lighter and requires more of it to accomplish the same results. A study of these questions will aid one in ventilating his mine or building.

POLK COUNTY.

List of companies, firms and individuals operating mines in the Third District, their location and their shipping facilities, if any.

FIRM.	LOCATION OF MINE.	SHIPPING FACILITIES.
Saylor Coal and Mining Co.	5½ miles north of Des Moines	Chicago & North Western.
Des Moines Coal and Mining Co.	5 miles north of Des Moines	Chicago & North Western.
Maple Grove Coal and Mining Co.	4 miles northeast of Des Moines	Chicago & Great Western.
Norwood Coal & Mining Co.	6 miles northeast of Des Moines	Chicago & Great Western.
Highland Coal and Mining Co.	5 miles northeast of Des Moines	Chicago & Great Western.
Gibson Coal and Mining Co.	2 miles east of Des Moines	Chicago & Great Western.
Midway Coal and Mining Co.	5 miles southwest of Des Moines	Chicago & Great Western.
Christy Coal and Mining Co.	6 miles east of Des Moines	Chicago, Rock Island & Pacific.
Lowe Smith Coal and Mining Co.	3 miles east of Des Moines	Chicago, Rock Island & Pacific.
Glenwood Coal and Mining Co.	3 miles south of Des Moines	Chicago, Rock Island & Pacific.
Elko Coal and Mining Co.	8 miles southwest of Des Moines	Chicago, Rock Island & Pacific.
Bloomfield Coal and Mining Co.	3 miles north of Des Moines	Chicago, Milwaukee & St. Paul.
Keystone Coal and Mining Co.	3 miles northwest of Des Moines	Chicago, Milwaukee & St. Paul.
Eagle Coal and Mining Co.	2½ miles northwest of Des Moines	Chicago, Milwaukee & St. Paul.
Central Coal and Mining Co.	2½ miles northwest of Des Moines	Chicago, Milwaukee & St. Paul.
Flint Brick, Coal and Mining Co.	4 miles north of Des Moines	Des Moines Street Railway Co.
Co-Operative Coal and Mining Co.	3½ miles north of Des Moines	Des Moines Street Railway Co.
Diamond Joe Coal and Mining Co.	Runnels	Wabash

BOONE COUNTY.

Boone Coal and Mining Co.	Millford	Chicago & North Western.
W. D. Johnson Coal and Mining Co.	Incline	Chicago & North Western.
Grow Coal and Mining Co.	3 miles west of Booneboro	Chicago & North Western.
Healy Coal and Mining Company	1½ miles west of Booneboro	Chicago & North Western.
Richter Coal and Mining Co.	1½ miles west of Booneboro	Chicago & North Western.
Richter Coal and Mining Co.	2 miles west of Booneboro	Chicago & North Western.
Morgan & Canfield Coal and Mining Co.	5 miles west of Booneboro	Chicago & North Western.
Rodgers Coal and Mining Co.	Incline	Chicago & North Western.
Boston Bros. Coal and Mining Co.	3½ miles west of Booneboro	Chicago & North Western.
Boone Valley Coal and Railway Co.	Fraser	Boone Valley Coal and Railway Co.

WEBSTER COUNTY.

FIRM.	LOCATION OF MINE.	SHIPPING FACILITIES.
Webster County Coal and Land Co.....	3 miles southwest of Lehigh.....	Mason City & Ft. Dodge Railway Co.
Daily Coal and Mining Co.....	3 1/4 miles southwest of Lehigh.....	Mason City & Ft. Dodge Railway Co.
Crooked Creek Coal and Mining Co.....	2 1/4 miles south of Lehigh.....	Crooked Creek Coal and Railway Co.
Corey Coal and Mining Co.....	2 1/4 miles south of Lehigh.....	Mason City & Ft. Dodge Railway Co.
Gleason Coal and Mining Co.....	Coalville.....	Mason City & Ft. Dodge Railway Co.
Collins Coal and Mining Co.....	Coalville.....	Mason City & Ft. Dodge Railway Co.
Pleasantville Coal and Mining Co.....	1 1/4 miles east of Coalville.....	Mason City & Ft. Dodge Railway Co.
Craw Coal and Mining Co.....	Kalo.....	Minneapolis & St. Louis.
Johnson Coal and Mining Co.....	Kalo.....	Minneapolis & St. Louis.
Irwin Bros Coal and Mining Co.....	Kalo.....	Minneapolis & St. Louis.

JASPER COUNTY.

Jasper County Coal and Mining Co.....	3 miles south of Colfax.....	Iowa & Northern; C. G. W.; C. R. I. & P.
Colfax Coal and Mining Co.....	4 miles southeast of Colfax.....	Iowa & Northern; C. G. W.; C. R. I. & P.

DALLAS COUNTY,

Carpenter Coal and Mining Co.....	6 miles southwest of Madrid.....	Chicago, Milwaukee & St. Paul.
Hutchinson Bros Coal and Mining Co.....	2 miles west of Dawson.....	Chicago, Milwaukee & St. Paul.

POLK COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POSTOFFICE ADDRESS.	Shaft or slope.	PLAN OF WORK-ING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Des Moines Coal and Mining Co.....	Chas. Morris.....	Des Moines.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.
J. M. Christy Coal Co.....	Geo. Grylls.....	Des Moines.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.
Saylor Coal Co.....	D. B. Flemming.....	Des Moines.....	Shaft.....	Room and pillar.....	Fan.....	Steam.....	Shipping.

Maple Grove Coal Co	Chas. Swanson	Des Moines	Shaft	Room and pillar	Fan	Shipping
Gibson Coal Co	Geo. Gibson	Des Moines	Shaft	Room and pillar	Fan	Shipping
Bloomfield Coal Co., No. 2	Geo. Yaro	Des Moines	Shaft	Room and pillar	Fan	Shipping
Diamond Joe Coal Co	Geo. Ramsay	Des Moines	Shaft	Room and pillar	Fan	Shipping
Keystone Coal Co	G. M. Grey	Des Moines	Shaft	Room and pillar	Fan	Shipping
Wagye Coal Co	G. M. Holmes	Des Moines	Shaft	Room and pillar	Fan	Shipping
Midway Coal Co	C. H. Fullerton	Des Moines	Shaft	Room and pillar	Fan	Shipping
West Riverside Coal Co	Jos. Jackson	Des Moines	Shaft	Room and pillar	Fan	Shipping
Flint Brick Coal Co	Michael Quinn	Des Moines	Shaft	Room and pillar	Fan	Shipping
Co-operative Coal Co.	A. Bloomquist	Des Moines	Shaft	Room and pillar	Fan	Shipping
Central Coal Co	Tom Ray	Des Moines	Shaft	Room and pillar	Fan	Shipping
Oak Park Coal Co	C. McClellan	Des Moines	Shaft	Room and pillar	Fan	Shipping
Glenwood Coal Co., No. 1	Charles John	Des Moines	Shaft	Room and pillar	Fan	Shipping
Glenwood Coal Co., No. 2	Charles John	Des Moines	Shaft	Room and pillar	Fan	Shipping
Proctor Coal Co	Wm. Edge	Des Moines	Shaft	Room and pillar	Fan	Shipping
Wilco Coal Co	Thos. Beck	Des Moines	Shaft	Room and pillar	Fan	Shipping
South Park Coal Co	Andy Carlson	Des Moines	Shaft	Room and pillar	Fan	Shipping
Avon Coal Co	Geo. Evans	Levy	Shaft	Room and pillar	Fan	Shipping
Coal Hill Coal Co	J. W. Hammond	Des Moines	Shaft	Room and pillar	Fan	Shipping
Highland Coal Co	L. Limblom	Des Moines	Shaft	Room and pillar	Fan	Shipping
Humes Coal Co	Robt. Humes	Commerce	Shaft	Room and pillar	Fan	Shipping
Commerce Coal Co	L. Tilton	Commerce	Shaft	Room and pillar	Fan	Shipping
Likes Brick and Coal Co	Jos. O'Neil	Des Moines	Slope	Room and pillar	Fan	Shipping
Sortel Coal Co	Geo. Shortell	Des Moines	Shaft	Room and pillar	Furnace	Local
Balzar Coal Co	Geo. Balzar	Des Moines	Shaft	Room and pillar	Furnace	Local
McKinney Slope	A. McKinney	Des Moines	Slope	Room and pillar	Furnace	Local
Newman Coal and Brick Co	Chas. Newman	Hastie	Slope	Room and pillar	Furnace	Local

BOONE COUNTY.

Boone Valley Coal and R'y Co., No. 2	Thos. Carpenter	Boone	Shaft	Long wall	Fan	Shipping
Boone Valley Coal and R'y Co., No. 3	Thos. Carpenter	Boone	Shaft	Long wall	Fan	Shipping
Boone Coal and Mining Co., No. 2	Samuel McClure	Fraser	Shaft	Long wall	Fan	Shipping
Boone Coal and Mining Co., No. 3	Samuel McClure	Fraser	Shaft	Long wall	Fan	Shipping
Boone Coal and Mining Co., No. 4	Samuel McClure	Fraser	Shaft	Long wall	Fan	Shipping
W. D. Johnson Coal Co	W. D. Morgan	Boonsboro	Shaft	Long wall	Fan	Shipping
Hepas Bros. Coal Co	Geo. Hepas	Boonsboro	Shaft	Long wall	Fan	Shipping
Zimbleman Coal Co	Geo. Zimbleman	Boonsboro	Shaft	Long wall	Fan	Shipping
Crow Coal Co	Wm. Crow	Boonsboro	Shaft	Long wall	Fan	Shipping
Morgan & Canfield	W. D. Morgan	Boonsboro	Shaft	Long wall	Fan	Shipping
Benson Coal Co	Wm. Benson	Boonsboro	Shaft	Long wall	Fan	Shipping
Risher Coal Company	T. W. Hughes	Boonsboro	Shaft	Long wall	Fan	Shipping
Rodgers Coal Co., No. 1	Geo. Rogers	Boonsboro	Shaft	Long wall	Furnace	Shipping
Rodgers Coal Co., No. 2	Geo. Rogers	Boonsboro	Shaft	Long wall	Furnace	Shipping
Rodgers Coal Co., No. 3	Geo. Rogers	Boonsboro	Shaft	Long wall	Furnace	Shipping

BOONE COUNTY—CONTINUED.

NAME OF COMPANY FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Shaft or Slope.	PLAN OF WORKING MINE.	HOW VENTILATED.	Power used.	Shipping or local.
Orden Coal Co.	Jno. Benson.	Orden	Shaft	Long wall	Fan.	Steam	Local.
Wilson mine.	Jas. Wilson	Pilot Mound	Shaft	Room and pillar.	Furnace	Horse	Local.
McCormick Coal Co		Luther	Slope		Furnace		Local.
Wiscup Coal Co.		Luther	Slope		Furnace		Local.

WEBSTER COUNTY.

Crooked Creek Coal Co., No. 4.	F. E. Wilson.	Webster City.	Shaft	Long wall	Fan.	Steam	Shipping.
Crooked Creek Coal Co., No. 5.	F. E. Wilson.	Webster City.	Slope.	Long wall	Fan.	Steam	Shipping.
Webster Coal and Land Co., No. 1.	Geo. Dawson.	Lehigh	Shaft	Room and pillar.	Fan.	Steam	Shipping.
Pleasant Valley Coal Co.	Jerry Dawson.	Kalo	Shaft	Room and pillar.	Fan.	Steam	Shipping.
Gleason Coal Co.	Jas. Gleason	Coalville	Shaft	Long wall	Fan.	Steam	Shipping.
Correy Coal Co., No. 2.	Rees Stephens	Lehigh	Shaft	Room and pillar.	Furnace	Steam	Shipping.
Collins Bros. Mine.	Frank Collins	Coalville	Shaft	Long wall	Fan.	Steam	Shipping.
Johnson Coal Co.	Wm. Johnson	Kalo	Shaft	Long wall	Fan.	Steam	Shipping.
Irwin Bros. Coal Co.	Thos. Irwin	Kalo	Shaft	Long wall	Fan.	Horse	Local.
Owen Mine.	Frank Owen	Ft. Dodge	Shaft	Long wall	Furnace	Horse	Local.
Timmons Mine.	R. Timmons	Ft. Dodge	Shaft	Long wall	Furnace	Horse	Local.
Martin Mine.	R. Martin	Coalville	Slope	Room and pillar	Fan	Steam	Shipping.
Craig Coal and Mining Co., No. 2.	Jerry Dawson	Kalo.	Slope.	Long wall	Furnace	Horse	Local.
Craig Coal and Mining Co., No. 3.	Jerry Dawson	Kalo	Slope	Long wall	Furnace	Horse	Local.
Bennet Coal Co.	Bennet	Kalo	Shaft	Room and pillar	Furnace	Steam	Local.
Saltonstall Coal Co.	P. Lochray	Moorland	Shaft	Room and pillar	Furnace	Horse	Local.
Allen Coal Co.	T. J. Allen	Ft. Dodge	Shaft	Room and pillar	Furnace	Horse	Local.
Martin Coal Co.	Chas. Martin.	Moorland	Shaft	Room and pillar	Furnace	Horse	Local.

JASPER COUNTY.

Jasper County Coal Co., No. 4.	Henry Thomas	Collfax	Shaft	Room and pillar	Fan.	Steam	Shipping.
Jasper County Coal Co., No. 5.	Henry Thomas	Collfax	Shaft	Room and pillar	Fan	Steam	Shipping.
Collfax Coal and Mining Co.	Geo. Wilson	Collfax	Shaft	Room and pillar	Furnace	Horse	Local.
Barret Coal Co.	J. W. Barret	Collfax	Shaft	Room and pillar	Furnace	Horse	Local.

French Coal Co	Conax	Shaft	Room and pillar	Furnace	Horse	Local
Robt. Carson	Newton	Shaft	Room and pillar	Furnace	Steam	Local
Snooks Coal Co	Newton	Shaft	Room and pillar	Furnace	Horse	Local
Thomas Hanson	Collax	Shaft	Room and pillar	Furnace	Horse	Local
Ino. Gunter	Collax	Shaft	Room and pillar	Furnace	Horse	Local
Walker Mine	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local
Wm. White	Newton	Shaft	Room and pillar	Furnace	Horse	Local
Lister Coal Co	Vandalia	Shaft	Room and pillar	Furnace	Horse	Local
Wardel Mine	Newton	Shaft	Room and pillar	Furnace	Horse	Local

GUTHRIE COUNTY.

Renslow Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Caleb Thompson Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Scott Bros. Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Thorman Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Merchant Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Joe Butler Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Phil. Rayner	Fansler	Shaft	Long wall	Furnace	Horse	Local
Kittar Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Hughes Coal Co	Fansler	Shaft	Long wall	Furnace	Horse	Local
Reese Coal Co	Panora	Shaft	Long wall	Furnace	Horse	Local
Buckeye Coal Co	Panora	Shaft	Long wall	Furnace	Horse	Local
White Ash Coal Co	Panora	Shaft	Long wall	Furnace	Horse	Local

DALLAS COUNTY.

Carpenter Coal Co	Madrid	Shaft	Long wall	Fan	Steam	Shipping
Platt Brick and Coal Co	Van Meter	Shaft	Long wall	Fan	Steam	Shipping
Dawson Coal Co	Dawson	Shaft	Long wall	Fan	Steam	Local
Mills Coal Co	Linden	Shaft	Long wall	Furnace	Horse	Local
Reese Bros. Coal Co, No. 1	Madrid	Shaft	Long wall	Furnace	Horse	Local
Reese Bros. Coal Co, No. 2	Madrid	Shaft	Long wall	Furnace	Horse	Local
Morris Coal Co	Linden	Slope	Long wall	Furnace	Horse	Local

GREENE COUNTY.

Willow Grove Coal Co	Angus	Shaft	Room and pillar	Fan	Horse	Local
Gedwin Coal Co	Grand Junction	Shaft	Room and pillar	Furnace	Steam	Shipping
Ditchburn Coal Co	Angus	Slope	Room and pillar	Furnace	Horse	Local
Thomas Coal Co	Pago	Shaft	Room and pillar	Furnace	Steam	Local
Buckeye Coal Co	Mike Fife	Shaft	Room and pillar	Furnace	Steam	Local
Snake Creek Coal Co	Angus	Shaft	Room and pillar	Furnace	Horse	Local

STORY COUNTY.

NAME OF COMPANY, FIRM OR OPERATOR.	SUPERINTENDENT.	POST OFFICE ADDRESS.	Slope or Shaft.	PLAN OF WORK- ING MINE.	HOW VENTILATED.	Power used.	Shipping Local.
Story County Coal Co.	Wm. Benson ..	Summit	Shaft ...	Room and pillar ..	Fan	Steam ..	Shipping ..
Zenoville Coal Co	J. York ..	Gilbert	Shaft ..	Room and pillar ..	Furnace	Horse ..	Local ..

ADAIR COUNTY.

Bennet Coal Co	A. J. Bennet. . .	Adair	Shaft ...	Long wall	Fan	Horse ..	Local ..

ACCIDENTS.

Accidents fall into several classes: fatal, non-fatal, serious, and not serious. We draw a line between the different classes of accidents; yet just where this line should be is often a question. Any rule adopted must be flexible. Accidents occur from various causes in and around the mines. It seems to be human nature for a large majority of the men following a hazardous occupation gradually, in many ways, to become careless. We also find from statistics that more than sixty-five per cent of the accidents occurring below are caused through the negligence of fellow workmen, who have had, as a rule, years of practical experience in the mines. However we are glad to report thirty-three per cent less fatal accidents during the last biennial period than the previous biennial ending June 30, 1899; which all tends to show that those having supervision of the mines and the employes are gradually becoming more careful. Nevertheless, there are accidents that occur in and around the mines that, with a reasonable amount of precaution and care used, could still be reduced in number, which would be an advantage to all concerned; more especially to the unfortunate mothers, widows, and orphans that are left behind to battle for themselves.

It is probable accidents, that are not contained in this report, have occurred at the various mines that have not been reported to this office; either from neglect on the part of the company, or thinking them not of sufficient injury to report the same.

There was reported to this office from the various mines in the third district, during the past biennial period, thirty-eight noteworthy accidents: fourteen fatal and twenty-four non-fatal. The coroner's inquest for each fatal accident is on file in the general office.

The following is a summary of the accidents according to causes:—

S. O. Smith, who had been in the employ of the Carbondale Fuel company only five days, met with a very painful accident about 3:30 P. M. on August 15, 1899, from the effects of which he died during the night. The accident was caused in the following way: Mr. Smith was working in room number four, turned from the seventh north, in mine No. 2. He had filled his holes for the evening's blasts and went out to the room mouth to get the powder; leaving Robert Snook, who was working a room parallel, at the room face. While he was in the act of handling the powder at the powder-box, the coroner's jury find that in some unknown way the powder was ignited: from which explosion he received burns inwardly, to such an extent that he died.

At Boone Coal and Mining company's mine No. 1; located at Incline, Boone county, Mr. Robert Scollick, 49 years of age, while in the act of placing some props that had been knocked down by a fall of coal, was fatally injured by roof falling on him before he had placed the necessary supports under the same.

Charles Moll; employed in the Carbondale Coal company's mine, located at Carbondale; met death instantly by a piece of falling roof. The same, falling a distance of five feet, crushed Mr. Moll to the floor, where he was afterward found by Chas. Figg and Hugh Simpson; who called help to remove the slate from him; but life was extinct.

John Marshall was killed on the 29th day of November, 1899, in the Crow and Marshall shaft, located $5\frac{1}{4}$ miles west of Boone; in the following manner: He was superintendent of the sinking of this shaft. He went to the bottom of the shaft, and when ready to return got on a loaded bucket to ride to the surface. Material was being hoisted by an engine. The engineer hoisted the bucket, which Mr. Marshall was standing on, higher than usual. Mr. Marshall, thinking that he was being taken to the pulleys, let loose, turned head downward, going through the opening at the top, and falling to the bottom of the shaft; from which injuries he died.

While the Carbondale Coal company was putting up its tower over its No. 3 shaft all material was hoisted to the ground landing and there taken off and dumped. Mr. John Salvage, an employee of the company, was a top man. On the evening of December 8th he had taken a car of dirt off of the west cage and emptied the same. Returning to the shaft, the cage from which said car was taken had been removed to the bottom of the shaft, a distance of 125 feet. Mr. Salvage, not knowing of the change in cages, run the empty car into the open shaft and followed it down on top of the cage, injuring him internally, from which he died at 12:15 A. M. the the following day.

Joseph Kubic, who was mining coal for the Christy Coal company, on December 15, at 4:30 P. M., was found dead in his room under a shot of coal. Having lit one shot and thinking it had gone off, he returned to light a second shot; when the first one, not having gone off, exploded; crushing him inwardly.

On the morning of March 5, 1900, Jas. Powell came to his death by a fall of slate near the face of his room, while mining coal in the Avon mine near Levy, Polk county.

Wm. Channels, a top employee of the Des Moines Coal company, whose duty it was to handle the loaded cars as they were run off from the scales; was taking two cars down the main switch, and when in the act of twisting the brake he fell between said cars; the wheels passing over the body, crushing the arms so that amputation was necessary above the elbows. He also received a number of other bruises. The injuries afterward proved fatal. Time of the accident April 19, 1900, at 10:00 A. M.

A. Windbush, a cager at the Des Moines Coal company's mine, on the 20th of September, 1900, about 3:45 P. M., was pushing an empty car across the cage to change the same end for end, when the cage was taken away, catching Mr. Windbush between the cage and the cap, crushing him inwardly, from which injuries he died soon after being taken to the top landing.

There occurred at Carbondale mine No. 3, on December 5, 1900, about 10:45 an accident to A. L. Johnson in the following manner: While in the act of loading a car a piece of slate fell striking him on the head and shoulders and pinning him to the floor of the room. When taken out he lived only a short time.

An inquisition was held at Des Moines, Polk county, Iowa on the 6th, 9th and 11th days of February, 1901, before R. V. Ankeny, coroner of said county, upon the body of B. Logia, who while in the employ of the Christy Coal company, at Youngstown, Polk county, was killed on February 5th, about 4:45 P. M. Frank Jones was working in a room parallel to the room in which Mr. Logia worked, fired a shot on his right hand rib, which blew the shot of coal through into Mr. Logia's room, catching him while he was passing, and killing him almost instantly. Wm. Grant and Frank Jones both testified that Frank Jones stepped to the breakthrough, between the two rooms, and hallowed fire two different times. Whether Mr. Logia heard him or not is a question we will never be able to find out. The unfortunate man met death while trying to pass the shot in the pillar between the two rooms.

During the afternoon of April 13, 1901, Mr. Henry Thomas and Mr. Ryan were making a tour of their mine, No. 6, located at Colfax. They had visited nearly every working place in the mine, and when in the act of returning from the face of a room a piece of slate, weighing perhaps from six to eight hundred pounds, fell from between two slips, about half way between the face and the mouth of the room, striking Mr. Thomas on the head, crushing him to the floor; from which injury he died within one hour from the time of the accident. Mr. Thomas had charge, as superintendent, of the Jasper County Coal company's mines, for more than 30 years, and at no time prior to this accident did Mr. Thomas receive an injury in or around the mines of any consequence. Mr. Thomas was a man who was very careful; in fact, during this trip around the mine he had cautioned quite a number of his men to be careful and timber their places and keep their working places always safe. But this seemed to be one of the unforeseen accidents.

On the 20th of April, 1901, Vinton Swesia, an employee of the Webster County Coal and Land company, at Lehigh, was in the act of loading a car of coal at the road head, when a piece of undermined coal along the wall fell on him, catching him on the left side; also a piece of roof, from above the coal, fell striking him on the head; causing internal injuries from which he died. His partner, Wm. Phillips, being duly sworn, testified that he spoke to him about the safety of the coal and roof, when the deceased expressed himself as thinking it was perfectly safe.

Walter Miller, who was working mining coal for the Carbondale Coal company's mine No. 2, was asked on the morning of April 29, 1901, to drive a mule, which he consented to do, and in the act of bringing his first trip down the 10th north he fell off the tail chain under the car and was dragged quite a distance. He was removed to the pit-top, and into the engine room, at which time they did not suppose he was badly injured. From there he was taken home and a doctor called. Upon examination it was found that he had received internal injuries, from which he died at 9:00 P. M. on the above date.

On the morning of June 14, 1901, at 11:30 A. M., John Jones was killed in a room turned off the 4th west entry on the north side of the Norwood Coal company's mine in the following manner: He had two shots to fire. One was tamped with fuse. Lighting them both at the same time and going out upon the entry, remaining there until he thought both shots had gone off,

as he said to a man on the entry. Upon entering the room to see what the shots had done, when he reached the vicinity of the shot tamped with fuse, it went off, and Mr. Jones was completely covered by the shot of coal; breaking several bones and injuring him internally, from which he died within two hours after being taken to the surface.

George Fox, who was acting in the capacity as pit-boss for a short time, for the Gibson Coal company's mine No. 2, met with an accident at noon on May 6, 1900, in the following manner: He and some other employees were coming out for dinner, and a piece of rock on the entry fell catching Mr. Fox between the shoulders injuring his back, from which injury he suffered untold agony for several months, but finally dying from the effects of the same.

FATAL ACCIDENTS.

Table showing fatal accidents in District No. 3, for the biennial period ending June 30, 1901.

DATE.	NAME OF DECEASED.	OCCUPATION.	CAUSE OF CASUALTY.	NAME OF COMPANY OR FIRM.	WHERE LOCATED.
August 16, 1899	Samuel Smith.	Miner.	Explosion of powder.	Carbondale Coal Co.	Carbondale.
September 12, 1899	Robt. Scollick.	Miner.	Fall of coal.	Boone C. and M. Co.	Incline, Boone Co.
September 26, 1899	Chas. Moll.	Miner.	Fall of slate.	Carbondale Coal Co.	Carbondale.
November 29, 1899	Geo. Marshall.	Superintendent.	Fell down shaft.	Crow Coal Co.	Boonsboro.
December 9, 1899	Geo. Salvage.	Miner.	Fell down Shaft.	Carbondale Coal Co.	Carbondale.
December 15, 1899	Geo. Kubic.	Miner.	Discharge of shot.	Christy Coal Co.	4 mile Twp., Polk Co.
March 5, 1900	Geo. Powell.	Miner.	Fall of slate.	Avon Coal Co.	Levy, Polk Co.
April 19, 1900	Wm. Channels.	Laborer.	Thrown under car.	Des Moines C. and M. Co.	Marquisville.
September 20, 1900	A. Windbush.	Cager.	Caught betw'n cage and timbers.	Des Moines C. and M. Co.	Marquisville.
December 5, 1900	A. L. Johnson.	Miner.	Fall of slate.	Carbondale Coal Co., No. 3.	Carbondale.
February 5, 1901	B. Logia.	Miner.	Fall of slate.	Christy Coal Co.	Youngstown.
April 13, 1901	Henry Thomas.	Superintendent.	Fall of slate.	Jasper County Coal Co.	Colla.
April 16, 1901	V. Swesia.	Miner.	Fall of coal.	Webster County Coal Co.	Lehigh.
April 29, 1901	Walter Miller.	Miner.	Fell under car.	Carbondale Coal Co.	Carbondale.
June 14, 1901	John Jones.	Miner.	Fall of coal.	Norwood Coal Co.	Berwick.

NON-FATAL ACCIDENTS.

Table showing Non-Fatal Accidents in District No. 3, for the biennial period ending June 30, 1901.

DATE.	NAME.	OCCUPATION.	CHARACTER OF INJURY.	CAUSE OF ACCIDENT.	RESIDENCE.
July 7, 1899	Samuel Sage	Miner	Leg broken	Fall of slate	Colfax
July 10, 1899	W. Finnegan	Miner	Shoulder	Fall of slate	Carbondale
August 2, 1899	Thos. Cooper	Driver	Ribs squeezed	Fall of slate	E. of Des Moines
August 11, 1899	I. W. Williamson	Veigh boss	Foot cut	Fall of coal	Des Moines
December 9, 1899	L. McMinney	Miner	Leg broken	Flying coal	Des Moines
December 20, 1899	Chas. Peterson	Miner	Foot hurt	Brake on engine slipped	Saylor
December 23, 1899	A. Wickland	Miner	Shook up	Brake on engine slipped	Carbondale
January 12, 1900	I. Sloan	Miner	Not serious	Flashshot	Colfax
April 6, 1900	Thos. Robinson	Pit boss	Back injured	Fall of coal	E. Des Moines
May 15, 1900	Geo. Fox	Miner	Back injured	Fall of rock	Colfax
June 22, 1900	Wm. Honzle	Driver	Leg fractured	Fall of slate	Colfax
August 2, 1900	S. Lundstrum	Miner	Not serious	Fall of slate	Saylor
August 20, 1900	N. G. Johnson	Miner	Broken leg	Fall of slate	Boone county
September 22, 1900	C. Simpson	Driver	Bone in foot broken	Caught between cars	Lehigh
November 15, 1900	W. Birmingham	Miner	Ribs crushed	Fall of slate	Summit
December 26, 1900	A. Frevehan	Miner	Ankle bone broken	Fall of slate	Colfax
December 26, 1900	I. Surdivant	Miner	Bone of leg cracked	Fall of slate	Lehigh
January 4, 1901	Frank Harris	Miner	Wrist bone broken	Fall of slate	Saylor
January 22, 1901	Creed Taylor	Miner	Two ribs broken	Fall of slate	Colfax
February 15, 1901	David Morgan	Miner	Collar bone broken	Fall of slate	Des Moines Twp.
March 8, 1901	I. Atkinson	Brusher	Spine injured	Fall of slate	Fraser
April 19, 1901	Eil. Bgork	Miner	Back crushed	Fall of slate	N. E. Des Moines
April 19, 1901	Wm. Lewis	Miner	Leg broken	Shot from adjoining room	W. Des Moines

POLK COUNTY.

The people of Iowa are largely an agricultural class, and Iowa, too, is above most states of the union as an agricultural producer. The mineral wealth, although superior to that of many other states, has not had the attention it merits. But in recent years especially her coal deposits have been attracting increased attention and capital, to such an extent that the coal industry of the state ranks it well up to the top of coal-producing states, and makes it the largest coal producer west of the Mississippi river.

The developed coal strata begins at Webster county, in the northwest part of the state, and continues southeast to the southern tier of counties, ranging in width from five to thirty miles.

Polk county, located nearly centrally in this belt, and owing to her superior railroad facilities and the great demand for local consumption which the county of Des Moines affords, probably surpasses most other localities. The theory existing in the minds of many people as to the extent and shape of the bodies of coal we will not discuss or trouble the reader with here. It is only necessary to say that the different large companies which are locating plants in this county, and the vast amount of drilling that is being done, from time to time, by large mining companies in the various parts of the county; also the large, well-equipped mining plants that are now in operation, some of them having an output of 1000 tons daily, only demonstrates that Des Moines, the county seat of Polk county and the capital of the state of Iowa, and much the largest city in the above state, is fast coming to the front as a manufacturing city; chiefly from the inexhaustible supply of steam coal so readily accessible.

On investigation of the various drillings that have been done from time to time, also the mines that are now in operation in the different parts of the county, we find that the most careful calculations show it has in the eastern 50,000 acres of coal land. The coal under these broad acres varies in thickness from two and one-half to six feet; showing Polk county thus has, on round numbers, 152,000,000 tons of merchantable coal underlying its surface.

The mines are divided up in groups, and are located on the various railroads in such a way as to be able to divide their product to very good advantage. North of Des Moines, and within three miles of the city limits, we find two large modern equipped mines, located on spurs from the C. & N. W. R. R., known as the Des Moines and Saylor Coal and Mining companies. The Saylor company has one of the largest and most complete direct first motion engines now in use in the state, and has also placed a new 33½ foot fan within a year over its airshaft. Its main shaft is 225 feet deep; the employes in and around the mines number 264 men and boys; capacity 100 tons. The Des Moines Coal and Mining company use mechanical

haulage, having in use an endless rope system, which transports a large portion of their coal more than three-quarters of a mile. Within a year their top landing, tipples and chute have been raised six feet higher and completely remodeled. For furnishing ventilation the company has two large improved fans, placed at each airshaft, one being located near the extreme end of the west workings; depth of main shaft 225 feet; employes working in and around the mine 285.

Northeast of Des Moines four to six miles, in conjunction with the C. G. W. R'y, is located the Maple Grove Coal company's mine No. 2, which mine has been in operation for several years. Above the Maple Grove mine the Norwood Coal and Mining company is operating the plant formerly owned by the Evans Coal company. It is completely overhauling the tower, cages, tipples, scales and fan. When completed the mine promises to be one among the large coal producers. What was known as the C. G. W. mine is being operated by a new company East of the city of Des Moines, near the edge of the city limits, the Gibson Coal company has its No. 3 mine, also on the C. G. W. R'y.

Five miles east of Des Moines there are three mines located on the C. R. I. & P. Ry., namely: The Christy Coal company's, and Lowe and Smith Coal company's mines Nos. 2 and 3. The Lowe and Smith mines were formerly operated by the Carbondale Coal company, and are located near Carbondale, employing 350 men.

The Christy mine has been in operation for a number of years, having hauled a large portion of its coal over three-fourths of a mile of track; it has in operation one among the best tail rope haulage systems in the state, which in former years was taxed to its capacity, for the mine was then quite a large coal producer. The depth of the coal from the surface in this locality varies from 130 to 200 feet. Veins of coal will average about $4\frac{1}{2}$ feet in thickness. Employes in and around the mine number 125 men.

The Beck Coal and Mining company, operates a mine $3\frac{1}{2}$ miles southwest of Des Moines, located on the Winterset branch of the C. R. I. & P. R. R. The Flint Brick Coal company operates a mine principally for its own use in connection with its brick plant; also ships considerable coal over the street railway, which connects with the plant. The Co-operative Coal company has a mine located on the same street railway, and has also a very large local trade. There are a number of mines that have no railway connections, that do quite a large shipping business. The Bloomfield Coal and Mining company has one among the best equipped mines for local trade, and has a very large local business, besides the large amount of coal hauled from the mine and loaded on cars. It employs during the winter 175 men.

Northwest of the city limits of the city of Des Moines are located, within a radius of one mile of each other, the Keystone Coal company's mine No. 1, Eagle Coal company's mine, and Central Coal company's mine. Each have in its employ, during the winter season, from 60 to 125 men. While there is considerable coal loaded on cars from the mines, at least seventy-five per cent of their entire output goes to the local consumers within the city limits. Coal averages in thickness from 4 to 5 feet, and is found from 90 to 125 feet below the surface.

Glenwood has within the last year, opened a mine east of the city limits,

equipped the same for a large local business, and expects in the near future to have a switch from the C. R. I. & P. R. R.

There are within the county 30 mines, which mines, during the biennial period, produced 1,793,000 tons of coal, which gave employment to 1310 miners and 461 day men, making a total of 1770 men working in and around the mines. For their labor the miners were paid, during the period, \$1,452,180, while the day men received \$555,400, making a total paid out by the mining companies, of the county, \$2,007,360; for the labor performed in and around the mines. During the last year of the biennial period there was paid out for props, tracking, etc., \$36,940, and there were improvements made during the year to the amount of \$59,870.

BOONE COUNTY.

The output of coal for the year ending June 30, 1900, was 281,180 tons; for the year ending June 30, 1901, 302,800 tons; making a total, for the biennial period, of 583,480 tons; giving employment, on an average, to 660 miners, and 260 day men; making a total of 920 men, which were employed in and around the mines. There was produced for each employe about 320 tons of coal per year. Taking into consideration the miners who mine coal only during the winter season, this certainly is an excellent average; moreover, a suspension of work at Fraser, during the early part of the first year, reduced the output to considerable extent.

There are several new shafts being put down, at this writing. They are being equipped with the latest improved machinery and, when thoroughly opened up, will increase the production of coal in Boone county considerably; especially, taking into consideration the large acreage of workable coal territory surrounding some of the large mining companies' plants.

The condition of the mines has been gradually improved, especially with regards to safety appliances, traveling ways, escape-shaft, safety-catches, and other devices for safety, which have in some instances been considerably improved.

The larger mines are controlled by the following companies: Boone Valley Coal & R. R. Co. has in operation two mines at Fraser; Nos. 1 and 3; is now equipping its No. 4 mine, and is laying the track up to the mine. This company has its own railroad connecting with the M. & St. P. at Fraser Junction, also with the C., R. I. & P. R. R. at Gowrie. The Boone Coal & Mining Co. operates Nos. 2 and 3 at Milford, four and one-half miles north-west of Boonsboro; and has shipping facilities over the C., N. W. R. R. The balance of the shipping mines lying west of Boonsboro all have C., N. W. connections. The W. D. Johnson, Crow, Zimbleman, and Heaps Coal companies, all being within a short distance of each other, one and one-half to three miles west of Boonsboro; employing from seventy-five to 50 men.

Coal in this section lies from 200 to 225 feet below the surface; averaging about three feet in thickness, and is of an excellent quality.

WEBSTER COUNTY.

Webster county lies the farthest north of all our coal producing counties. Coal was being mined in this county, in small drift mines, between 1855 and 1860, being more than forty years since the mineral was first discovered and mined in the county. Nine tenths of the coal that has been produced was from developments within a radius of six miles of Kalo, which town is located on the Des Moines river, six miles below Ft. Dodge; also within a radius of four miles of Lehigh. These are the only two points that coal has been mined, to any great extent, in the county, except at Coalville, which lies directly east of Kalo, which, at present, is quite a mining point. There was produced in this county, during the biennial period, 323,700 tons of coal, which gave employment to an average of 385 miners and 105 day men, making a total of 490 employes in and around the mines of Webster county. Within the county are twenty-four mines, twelve of which are equipped with steam hoisting appliances and equipments.

We find along the banks of the Des Moines river, which flows diagonally across the county, from northwest to southeast, coal-measures exposed at various points, showing that it is quite probable there is a large acreage of undeveloped coal within this county. While the coal is usually from two and one-half to three feet thick, it is of an excellent quality, and is mined on the longwall system. However, the Gleason Coal Co's. mine, located at Coalville, is working a six-foot vein; yet, the adjacent territory is usually thinner. The vein lies from 40 to 130 feet from the surface.

Some years ago practical investigation of the various geological formations, in this county, showed deposits of gypsum in paying quantities. Since then there have been several gypsum mines opened and mills built, and the product has gradually increased until they are now producing quite a large tonnage of the same. There are eight mines and mills, located within a radius of five and one-half miles of Ft. Dodge, producing gypsum and stucco under the following companies: Iowa Plaster Association, having in its employ 125 men; Duncombe Stucco Co., 35; Cardiff Gypsum Plaster Co., 40; Ft. Dodge Plaster Co., 30; Mineral City Plaster Co., 30; there being thus a of 290 men working in and around the gypsum mines and mills.

JASPER COUNTY.

Jasper county ranges fourth as a coal producer in the Third district. However, the amount of drilling that has been done during the last biennial period has clearly demonstrated that the best and the thickest coal is now being developed. The Jasper County Coal Co., which has quite a large acreage of coal-land, after drilling quite a number of holes located and opened its No. 5 shaft, three miles south of Colfax, being the first coal worked in this locality. Within the last fifteen months this company has done considerable drilling east of its No. 5 shaft, where a thicker and better quality of coal is found. At this place, one-half mile east of No. 5, the company has sunk its No. 6 shaft; which shaft is equipped with the latest improved machinery, and one of the J. M. Christy box car loaders. This plant employs about 270 men in and around the mine, and is connected with

the C. R. I. & P. R. R. and the C. G. W. R. R. by its own line of railroad, which line continues two miles farther east to where is located the Colfax Coal & Mining Co's. mine No. 1, which is a large well proportioned shaft sixty feet in depth and equipped with good machinery and mining facilities. This company has a large acreage of coal land adjoining its plant, where considerable drilling has been done, that will, no doubt, soon develop results. Since making this opening, the company has built quite a number of houses for its employees, and also made a number of improvements in the vicinity. With the addition to Jasper county of the Colfax Coal & Mining Co., which promises to soon be a large coal producer, there is no doubt that the county will, in a very short time, show quite an increased tonnage.

There was an average of 255 miners employed at mining coal during the past biennial period, also 70 day men; making a total of 325 men working in and around the various mines in the county. There was produced, during the past biennial period, 291,000 tons of coal.

DALLAS AND GUTHRIE COUNTIES.

The coal measures are very much alike in these counties. The coal seam now being worked, in the counties, lies in close proximity to the South and Middle Raccoon rivers and the Des Moines river, and is of about the same thickness, quality, and nature of the roof throughout the counties. The vein of coal now being worked is very often exposed along the banks of the rivers named. The coal is of a very good quality, being very hard, bright, and a free burner. There is quite a demand for coal at the various mines during the winter months. Coal sells at the mines for \$2.50 per ton, and it often occurs, during cold snaps, that the mines are unable to supply the demands, for very few of our local mines make the necessary improvements to stock coal ready for the extra demand made on them; but where they do prepare for such they profit by it. Long wall method is used throughout the various mines. The largest mining plant, in these counties, is operated by the Carpenter Coal company, and is located midway between Madrid and Woodward, and $1\frac{1}{2}$ miles south of the Milwaukee railway. This plant is equipped with an electric mining plant, and also with modern improved machinery, and has good shipping facilities, enabling the product to reach the northwestern markets for a less freight rate than those plants farther away.

GREENE COUNTY.

There are only six or eight mines in this county. They employ, during the winter months, about 80 to 100 men; during the summer season they mine some coal, which they haul to Angus and load on cars. Being near the northern market they have an advantage in freights. The largest expense in operating some of the mines near Angus is handling the water. The coal seems to be of a very bright nature and of good quality.

STORY COUNTY.

There is a decrease in the output of coal in this county, for the biennial period, owing to the abandonment of the mining plant located at Summit, which was operated by Benson Bros., of Boonsboro. This plant heretofore produced seven-tenths of the coal produced in the above county. The equipments connected with it have been moved into Boone county.

ADAIR COUNTY.

The mines of this county are small local mines that employ, during the winter season, from 4 to 8 men; usually beginning work about September 1st, or near the time local trade opens up, and continuing until spring. The coal is of an excellent quality, but only about 16 inches thick. Mining price is \$1.50 per ton.

TABLE No. 1.

Showing the number of mines, output of coal, number of miners and other employes, etc., in District No. 3, for the year ending June 30, 1900.

NAME OF COUNTY.	Number of mines.	Number of tons of coal, all grades produced.	Number miners employed.	Number other employes.	Amount paid miners, including yardage, room tannage, etc.	Amount paid other employes, including cost of supervision, etc.	Amount paid for timber, tracking, etc.	Cost of improvements, etc., including air and escape shafts.	Average price paid for mining per ton. lump coal.	Average price paid for mining per ton. mine run.
Polk...	36	854,500	1,235	446	\$ 684,980	\$269,000	\$35,915	\$ 66,945	89	59
Boone...	17	281,180	671	276	237,309	106,390	15,775	45,335	94	
Webster	18	156,400	389	98	144,380	76,640	9,135	12,980	96	
Jasper...	16	159,200	257	66	118,850	43,857	6,340	1,730	96	62
Guthrie...	14	17,700	94	43	21,940	7,350	590	720	110	
Greene...	6	11,850	54	16	16,830	7,900	280	950	85	
Dallas...	7	18,090	63	29	27,135	8,610	390	1,850	93	
Story...	2	5,300	29	9	6,350	2,100	400	2,600	106	
Adair...	3	3,800	31	13	7,100	2,940	210	250	125	
Total..	119	1,508,020	2,823	906	\$1,164,874	\$514,787	\$69,035	\$133,360		

TABLE No. 2.

Showing the number of mines, output of coal, number of miners and other employees, etc., in District No. 3, for the year ending June 30, 1901.

NAME OF COUNTY.	Number of mines.	Number tons of coal all kinds produced.	Number miners employed.	Number other employees.	Total amount paid miners, including yardage, room turning, etc.	Amount paid other employees, including cost of supervision, etc.	Amount paid for timber, tracking, etc.	Cost of improvements, etc., including air and escape shafts.	Average price paid for mining, per ton, lump coal.	Av. price paid for mining mine run coal, per ton.
Adair ..	36	938,630	1,320	478	\$ 767,200	\$276,400	\$36,900	\$ 59,870	\$.90	.....
Boone ..	17	302,800	645	290	272,520	151,430	16,540	37,650	1.03	.....
Webster ..	18	167,300	372	131	153,940	88,470	9,850	9,300	1.05	.....
Asper ..	16	134,500	249	59	113,200	41,240	5,080	23,000	.91	.....
Dallas ..	7	29,400	86	35	39,250	11,750	6,240	5,450	1.20	.....
Authrie ..	14	16,750	90	44	20,940	7,630	400	800	1.25	.....
Greene ..	6	12,400	52	21	18,340	8,650	250	350	1.00	.....
Tory ..	2	3,200	17	6	4,150	1,540	60	100	1.00	.....
Adair ...	3	2,740	14	5	3,200	1,130	40	100	1.50	.....
Total	119	1,607,690	2,845	1,059	\$1,392,740	\$588,240	\$76,260	\$136,570	.....	.....

TABLE No. 3.

Showing the output of coal of the counties comprising District No. 3 for the past five years.

COUNTIES.	1897.	1898.	1899.	1900.	1900.
Adair	2,500	11,000	1,700	3,800	2,740
Boone	329,285	314,997	371,410	281,180	302,800
Dallas	10,781	12,400	13,600	18,090	29,400
Greene	17,085	21,900	22,600	11,850	12,400
Authrie	11,340	16,000	16,400	17,700	16,750
Asper	153,000	157,430	188,800	159,200	134,500
Adair	572,895	707,360	790,410	854,500	938,600
Tory	12,240	9,010	9,600	5,300	3,200
Webster	101,643	143,812	187,650	156,400	167,300

WORD REGARDING THE INTERESTS OF ALL CONNECTED WITH THE COAL BUSINESS.

The coal trade, and the production of coal, rest upon a triangular base and equilateral triangle; namely, labor, capital and transportation. Any one is indispensable to the other two; therefore it is of the utmost importance that all should work on lines of common or mutual interests, though each one occupies a separate and distinct field. Yet the ultimate purpose of all is the same. Labor produces, or rather mines, the coal; capital, through the owner or operator of the mine, is the medium or agent between the miner, or laborer, and the consumers. Capital also furnishes the transportation, making the transaction complete. And the consumer pays for the value he receives, which, if on an equitable basis, divided equitably between labor and capital and transportation, gives each a fair return for the part each performed in the transaction.

Any differences of opinion that are trivial should not be allowed to come

in the way of success from either base. Instead a generous policy should be adopted and maintained by all, to the end that all may be constantly employed; for inactivity on the part of either is fatal to the other two; or I might say to the other two and the consumer also. Therefore any vital change in either base should not be made independently without the careful consideration of the interests of the other two. Differences of this nature cannot be, or we should more properly say, are not, promptly settled. But it may be as well, for thorough discussion does not hurt a just cause, and an unjust cause is exposed by such discussion.

A healthy, thriving business for the operator means plenty of work and its emoluments to the miner. The two are mutually dependent. The operator could not exist and be a dealer in coal unless the miner aided him in producing it; neither could the miner enter the mine and dig coal and earn wages unless there was some one to furnish the mine and the machinery to run it.

In the event that the market does not justify the price paid for mining and transportation, the only alternatives are to lessen the price of production and transportation, to close down the mine, and when the receipts become inadequate to cover expenses to change the method of the business; for it is just as unreasonable to expect the mine to run at a loss, or in a manner that would ultimately bankrupt the operator, as it is to expect the miner to take his tools and go into the mine and dig coal for less than living wages, or at a price that would likely bring his family and himself to privation. Of course, the closing down of a mine should not be considered except as a last resort, as it unsettles business, not only while the mine is inoperative, but often is the effect obvious for many months; while its consequences are shared more or less by each individual who is dependent upon the work.

To the casual observer the adjustment of these vexed and varied questions is solely in the hands of the mine owners; but it is not so, for the laborer jointly has an interest at stake equal to if not greater than the operator's. Therefore the interests of the laborer cannot be successfully ignored. It is a fact, though not recognized by some, that labor, as a factor in the world's progress, has rights that cannot successfully be passed over, independent of the mere wages the individual receives. And we think it a safe proposition to say that the failure to recognize this fact is often the cause of strikes and so-called "labor troubles" in this country, as well as in Europe. For the fact has been demonstrated by experience in the manipulation of matters appertaining to the business that a digression of opinions, when in pursuit of the same object, seldom terminates with success, at least not with any degree of permanency, and these disagreements, which occur between operator and miner, as a rule originate and are the outgrowth of wrong impressions and misunderstandings. Often there develops a feeling among the miners that the operator is exacting, his rules are too oppressive, and his dividends are greater than they should be. On the other hand, the operator attaches too little importance to the considerations of the miner, especially in relation to matters wherein the miner is directly concerned.

The operator, or capital, takes voluntarily the obligations and risk of furnishing the mine with all necessary equipments to operate it, and should have a fair return on the capital invested, and on the capital necessary to

pay for all labor performed, clerical and otherwise. But the miners and others that labor in and around the mines represent an equal interest jointly with that of the operator; and the risk to his life is more than equal to the capital, that is, the aggregate risk of the men.

Moreover, the situation of the miner, his work, and the surrounding conditions, with their attendant dangers, are of like importance; and when comparatively considered, with other kinds of labor, his hardships and endurance are more apparent, for when he takes his tools and miner's lamp and goes into the mine out of God's sunlight, to perform his arduous task, with the purpose in view of earning an honest dollar; he has no assurance whether he will walk out or be carried out, for his dangers are many and often not apparent. Even the precautionary measures of the mining laws are not always effective in averting casualties.

Although the official requisitements upon the operator are principally in the miner's interests, for his preservation and protection; and notwithstanding, he may be diligent and observant in the pursuance of his duties regarding sanitation, and the safe condition of the mine; yet there are many dangers unforeseen, and frequently accidents happen from causes that are almost unaccountable; evidencing the fact, that in the coal mine danger lurks in every entry, drive-way, and room. No matter how much discretion or caution the miner may exercise for his own protection, he is always liable to accidents that come without warning, and probably from an unexpected source, with fatal results or the laming for life. And very often the unfortunate is the husband and father of a family, that are dependent, and likewise are forced to bear the burden of distress. Thus the exposure and risk of the miner in connection with his labor, undoubtedly entitles him to a consideration in the councils that govern his conditions, and regulate the price of his labor; which was formerly denied him. But, now he is receiving the share of attention, in part at least, that is his due. And we are pleased to note the fact that those operators who the most fully recognize the equitable rights of labor as entirely independent of the individual are the best pleased with their business, and have the full confidence and respect of their men, without which, no business can be successfully conducted any length of time.

The stability of the business is dependent on, and can be regulated only by propositions that have their origin in, and are actuated by a joint representative council. For unquestionably confidence is the only reliable agency of medium that can reconcile the interests of miners and operators when any differences arise, and place them on a substantial basis with harmony. At least it is evident that strikes emanating usually from the impulsive and unpromising element of organized labor, and always from lack of confidence in the operator, have never been very effective in establishing favorable results. Nevertheless, organized labor is necessary and needful to a certain extent, and very advantageous if properly managed, but when controlled by rash and indiscreet persons, that are guided more or less by outside influences, it becomes a menace to business and in the main dominative and arrogant; and tends to compel capital to combine for protection, thereby widening the breach between miner and operator; who otherwise should be united in common efforts for the purpose of contributing to the welfare of the coal industry. Full confidence in, and respect for each other, by the

operators and men, also by and between the transportation companies and all other business, come under the same rule, and would entirely overcome great evils (for it is surely nothing less), and strikes and lockouts would be unknown.

Exercise tolerance and moderation in the light that each has rights that the other should respect, keeping in view at all times the fact that the man who furnishes the muscle, strength, and intellect to mine the coal should be credited in their business relations as the equal of the man who furnishes the capital and enterprise to build and operate the mine.

Operators, miners, and transportation companies should all banish prejudice; avoid competition, as regards both wages, freight, and markets; endeavor to establish confidence in the trade commercially; and promote and protect home markets in the interest of miners and mine owners. All general business appertaining to the coal trade would be appreciative of its beneficial results. For, beyond a doubt, the inauguration of these principles and a practical demonstration of their motives would culminate in success.

FIRST DISTRICT.

	TONS
For year ending June 30, 1900.....	1,679,050
For year ending June 30, 1901.....	1,964,050
For the two years.....	3,643,100
Miners June 30, 1900.....	3,762
Other employees June 30, 1900.....	1,406
Total number employees June 30, 1900.....	5,168
Miners June 30, 1901.....	3,906
Other employees June 30, 1901.....	1,396
Total number employees June 30, 1901.....	5,302
Average number of employees for the two years.....	5.235

SECOND DISTRICT.

	TONS
For year ending June 30, 1900.....	1,930,214
For year ending June 30, 1901.....	1,870,123
For the two years.....	3,800,337
Miners June 30, 1900.....	2,785
Other employees June 30, 1900.....	1,269
Total number employees June 30, 1900.....	4,054
Miners June 30, 1901.....	2,734
Other employees June 30, 1901.....	1,235
Total number employees June 30, 1901.....	3,969
Average number of employees for the two years.....	4.012

THIRD DISTRICT.

	TONS
For year ending June 30, 1900.....	1,508,020
For year ending June 30, 1901.....	1,607,690
For the two years.....	3,115,710

Miners June 30, 1900.....	2,823
Other employees June 30, 1900	996
Total number employees June 30, 1900.....	3,819
Miners June 30, 1901.	2,845
Other employees June 30, 1901	1,059
Total number employees June 30, 1901	3,904
Average number of employees for two years	3,862

ELEVENTH
BIENNIAL REPORT
OF THE
BOARD OF HEALTH
OF THE
STATE OF IOWA
FOR THE
PERIOD ENDING JUNE 30, 1901.



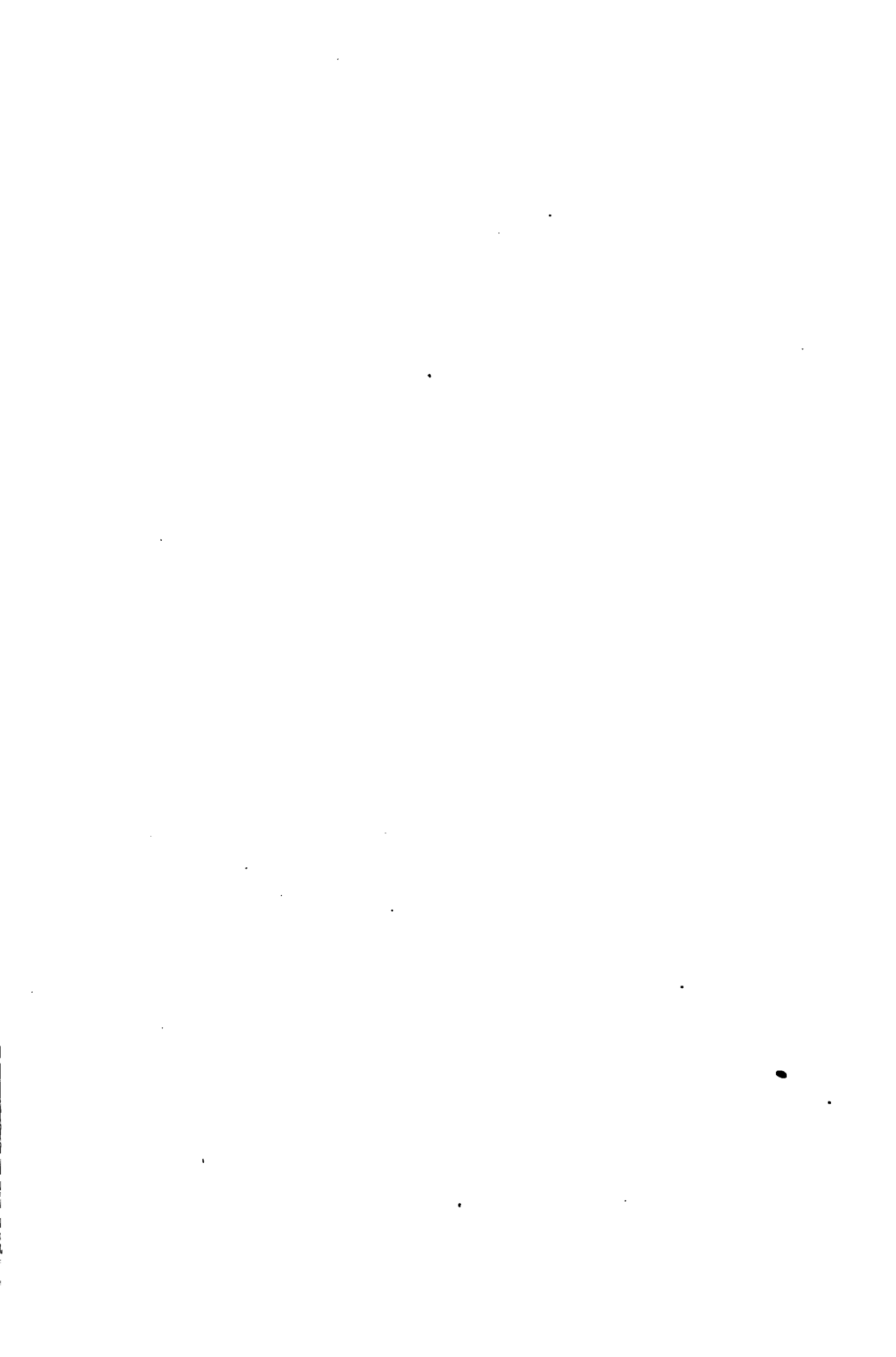
DES MOINES:
B. MURPHY, STATE PRINTER.
1901.

STATE OF IOWA,
OFFICE OF SECRETARY STATE BOARD OF HEALTH
DES MOINES, *July 1, 1901.*

To Leslie M. Shaw, Governor of Iowa:

SIR—In accordance with the provisions of section 2565 of the Code, the Eleventh Biennial Report of the State Board of Health, for the period ending June 30, 1901, is herewith presented.

J. F. KENNEDY, *Secretary.*



MEMBERS OF THE BOARD.

CHARLES W. MULLAN, Attorney General, Des Moines, *ex-officio*.

JAMES I. GIBSON, State Veterinary Surgeon, Denison, *ex-officio*.

WARREN DICKINSON, Civil Engineer, Des Moines.

TERM EXPIRES.

J. C. SHRADER, Iowa City (R).....	January 31, 1902.
A. M. LINN, Des Moines (H).....	January 31, 1903.
C. B. ADAMS, Sac City (H).....	January 31, 1904.
J. A. McKLVEEN, Chariton (E).....	January 31, 1905.
HENRY MATTHEY, Davenport (R)...	January 31, 1906.
R. E. CONNIFF, Sioux City (R).....	January 31, 1907.
F. W. POWERS, Reinbeck (R).....	January 31, 1908.

PREFACE.

Section 2565 of the Code makes it the duty of the Secretary of the State Board of Health, in his biennial report to the Governor, to "include so much of its proceedings, such information concerning vital statistics, such knowledge respecting diseases, and such instruction on the subject of hygiene as may be thought useful for dissemination among the people, with such suggestions as to further legislation as may be thought advisable."

In compiling the following report I have endeavored to conform fully to the requirements above stated.

A glance at the table of contents will show the wide range of sanitary subjects considered. The report on smallpox will be found interesting as it contains an account of the most widespread visitation of this disease in the history of the state.

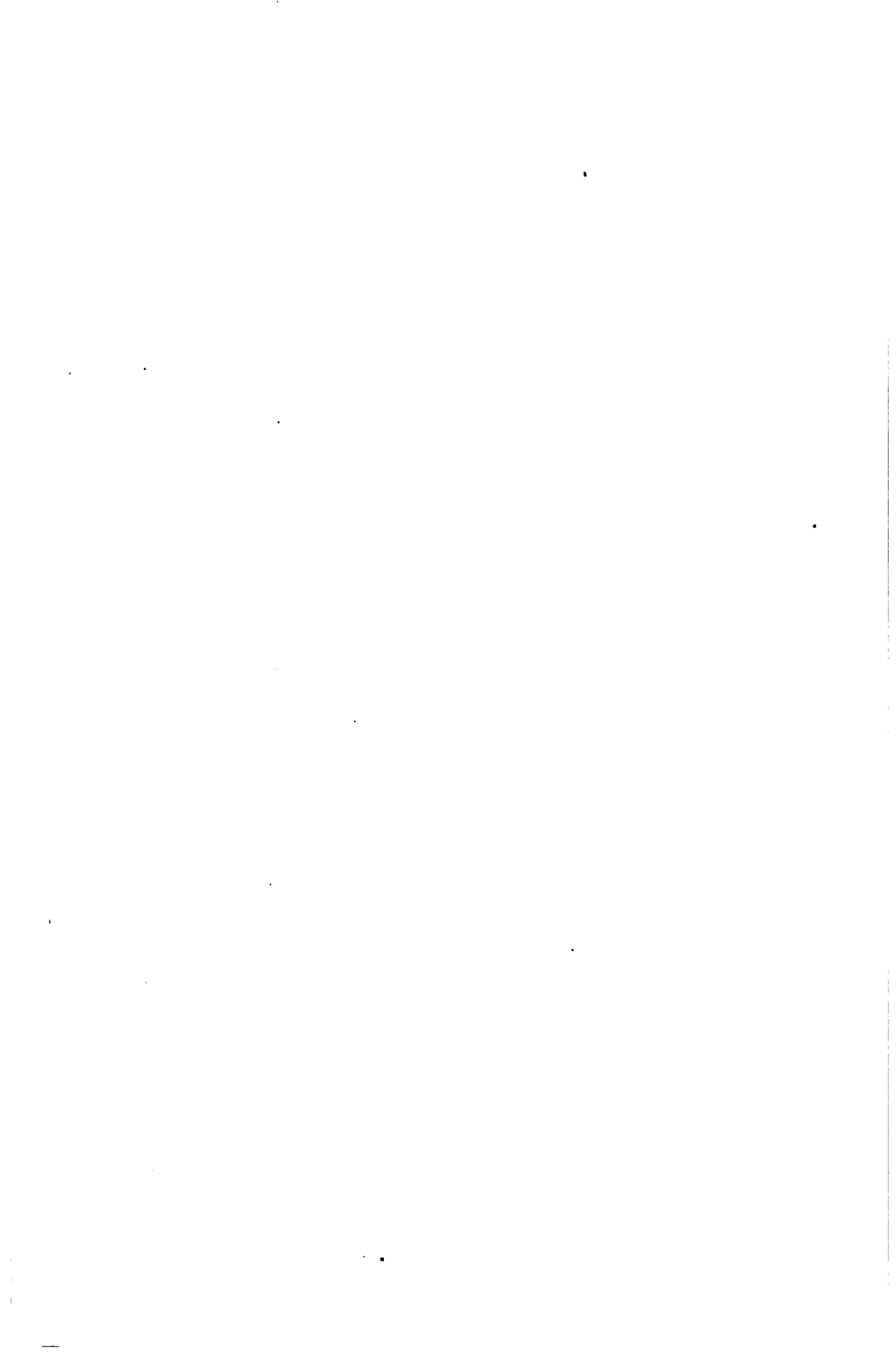
There are a number of exceedingly interesting and valuable reprints that I am able to reproduce through the kindness of their writers and publishers.

There are republished herewith the circulars issued by the Board and the laws relating to the public health and safety which are codified and indexed so as to be readily referred to.

I regret exceedingly that I am unable to present a more complete and reliable report upon vital statistics—a regret that will have to be repeated biennially until the law is changed.

The cuts illustrating articles in this report have in most cases been generously donated or loaned by the parties whose papers are so much improved thereby.

J. F. KENNEDY.



CONTENTS.

Board Meetings.....	I
State Board Medical Examiners.....	II
Embalmers' Department.....	III
Legislative Suggestions.....	IV
Railroad Accidents and Car Sanitation.....	V
Typhoid Fever.....	VI
Vital Statistics.....	VII
Municipal Sanitary Engineering.....	VIII
Methods of Infection and Notes on Disinfection.....	IX
Relation of Chemistry to Present-day Sanitation.....	X
Growth of Preventive Medicine.....	XI
Sanitation for the Farm.....	XII
Hygienic Treatment of Tuberculosis.....	XIII
British Congress on Tuberculosis	XIV
Bubonic Plague.....	XV
Scabies: Cause, Frequency, and Treatment.....	XVI
Smallpox.....	XVII
Formaldehyde Disinfection.....	XVIII
Disinfection against Infectious Diseases	XIX
School Gardening.....	XX
Relation of Water Supply to Animal Diseases.....	XXI
Sewage Disposal in Cities and Towns....	XXII
Beans, Peas, and other Legumes as Food....	XXIII
Eggs and Their Uses as Food.....	XXIV
Sanitary Aspects of Milk Supplies and Dairying.....	XXV
Laws Relating to Public Health and Safety.....	XXVI
Appendix.....	XXVII

I

BOARD MEETINGS.

SECOND QUARTERLY MEETING—AUGUST, 1899.

The second quarterly meeting of the State Board of Health was convened August 1, 1899, and called to order by President Scroggs at 9 A. M.

There were present: Scroggs, Guilbert, Conniff, McKlveen, Lader, Gibson, Dickinson, Matthey, and Bancroft.

The minutes of the last meeting were read and approved.

The report of the Secretary for the quarter ending July 31st was read and considered *seriatim*.

INFECTIOUS DISEASES.

The Secretary reported outbreaks of infectious diseases, as reported to his office, as follows:

I am pleased to note the fact that at present there is an unusual degree of good health throughout the State and that in very few localities infectious diseases prevail.

Reports of outbreaks have been received as follows, May:

Cerebro-spinal Meningitis.—Linn Grove; Ottumwa; Davenport; June, Burlington; July, none.

Cholera Infantum.—May, none. June, Burlington; Cedar Rapids; Des Moines. July, none reported.

Diphtheria.—May, Dows; East Orange township, Sioux county; Liberty township, Hamilton county; Riceville; Alton; Harrison township, Harrison county; Dunlap; Linn township, Linn county; Des Moines; Dubuque; Mars. June, Amsterdam township, Hancock county. July, Amsterdam township, Hancock county.

Measles.—May, Sibley; Rockford; Dubuque; Marengo. June, Sibley. July, none.

Scarlet Fever.—May, Alton; Correctionville; Lynnville; Kamrar; Har-
t; La Porte City; Lost Grove township, Webster county; Liberty town-
ship, Hamilton county; Wapello; Liscomb. June, Dawson township, Greene
county; Bennett; Grundy Center. July, Corning; Lake township, Wright
county; Coldwater township, Butler county; Washta; Dawson township,
ne county; Bennett; Holmes; West Liberty.

Smallpox.—May, Cresco; Rome; Orleans township, Winneshiek county; Le Claire; Iowa City. June, Iowa City: Pleasant Valley township, Scott county; Paris township, Howard county; Lourdes. July, none.

Typhoid Fever.—May, Davenport; Des Moines; Ottumwa. June, Buffalo Center. July, Franklin; Des Moines; Marshalltown.

Whooping Cough.—May, Slater; Keokuk. June, Boone; Burlington. July, none.

SMALLPOX.

I had hoped to lay before you an elaborate report of smallpox as it appeared in the various counties of the State. I have written to all who have in any way been identified with cases for data, to some several times. I still hope that I can have a complete report for the Biennial Report. From the data on hand I report as follows:

The first notification of the outbreak of the disease was from Hamburg, November 18, 1898, the source of infection being Nebraska City, Neb. I think it is safe to say that at least four-fifths of the cases that appeared in Iowa resulted from exposure to cases in Nebraska City or Omaha. It has appeared in the following counties:

Appanoose county. Franklin township, two cases, reported by H. E. Wilkinson, T. C.

Audubon county. Audubon, two cases; Douglas township, two; Exira, four; Kimbalton, one. Total nine.

Cedar county. Mechanicsville, two; Pioneer township, one. Total, three. Reported by S. T. Buell.

Fremont county. Percival, fifteen; Benton township, four; Hamburg, twenty-seven; Washington township, five. Total, fifty-one.

Henry county. Rome, two, reported by Dr. McKlveen.

Howard county. Cresco, fifty; Lourdes, three; Paris township, three. Total, fifty-six.

Johnson county. Iowa City, three, reported by Dr. Shrader.

Jones county. Springfield township, twenty-four, one death, reported by Dr. Williams.

Lee county. Pleasant Ridge township, one, reported by Dr. J. G. Geers.

Scott county. Davenport, one, reported by Dr. Preston; Le Claire, fifteen, reported by Dr. Matthey and two by Dr. Gamble; Pleasant Valley township, one, reported by Dr. Matthey. Total, nineteen.

Shelby county. Elkhorn, four; Jensen family, five, reported by Dr. McKlveen.

Warren county. Belmont township, one, reported by Dr. Price; Otter township, one, reported by Mr. Van Syoc; Milo, four, reported by Lou Dunn; Lacona, twenty-nine, reported by Dr. Hatfield. Total, thirty-five.

Washington county. Wellman, one, reported by Dr. Shrader.

Winneshiek county. Orleans township, one, reported by C. C. Brown, T. C.

Wayne county. Seymour, seven, reported by O. A. Cover; Genoa, one, reported by J. W. Gordon. Total, eight.

Number of counties reported, fifteen; number of cases reported, two hundred and twenty-three.

Dr. Matthey made the following special report respecting the outbreak at Le Claire.

GENTLEMEN.—During my recent visit to Le Claire, made for the purpose of investigating the cases of smallpox, I became acquainted with an osteopath practicing in that locality. When introduced to him I was ignorant of the fact that he was not a physician. Dr. Cantwell and I called first upon Dr. Bailey, the city physician, who then conducted us to the other members of the profession. At the residence of Dr. Gamble we met a young man of intelligent appearance, who, on hearing of our purpose, begged for permission to accompany us. This man was introduced as Dr. Meunier.

In our discussion relative to the nature of the cases—whether smallpox or chickenpox—Dr. Meunier took part. I was astonished when he suddenly addressed me with the words: "Of course I am not recognized by you, because I am an osteopath, but I have two cases of smallpox under my care."

Dr. Bailey remarked that these cases were diagnosticated by Dr. Gamble. I now began to question Dr. Meunier, and inquired how he undertook to treat smallpox. He replied that it would be necessary for me to study osteopathy in Kirksville before I could understand his methods. I assured him that I knew more about osteopathy than he, and told him to answer my questions. Only after I had repeatedly explained to him that he owed it to the assembly there present to respond to the query put to him, did he deign to acquiesce to my demands. With an obvious effort at circumlocution, he stated that in precisely the same manner in which the new science of osteopathy deals with other diseases, so, too, it deals with smallpox.

I did not, however, drop the question until he had specified that this method of treatment consists of manipulations with both hands in the form of rubbing, kneading, beating, and passive movements. With a shake of the head, I observed that these measures were rather strange ones to adopt in the treatment of smallpox, and determined to question him further.

To my inquiry regarding the osteopathic treatment of syphilis he responded by informing me that such diseases are not within the province of osteopathy. Gonorrhœa and all venereal diseases are excluded from the category of osteopathic affections. I called his attention to the fate of the millions of patients suffering with these diseases if the scientific world would acknowledge as supreme the doctrines of osteopathic faith. Regarding the treatment of puerperal fever, Dr. Meunier said that osteopathy had none but the best results to boast of. Gall-stones, Appendicitis, Cerebro-spinal Meningitis, and numerous other affections looked upon as serious pathological conditions are cured by osteopathic treatment in every instance. I remarked that similar statements are being constantly made by Christian Scientists, clairvoyants, spiritualists, somnambulists, cheiropaths, cancer doctors, and the like.

Thereupon he directed my attention to the brilliant results of the distinguished Dr. McFadon, of Davenport. I could not forbear to relate to him an incident which has come to my knowledge and in which the celebrated Dr. McFadon takes a prominent part.

During a bitterly cold night last winter, Dr. Crawford was summoned from his comfortable bed by an excited, impatient man, who begged the

doctor to accompany him immediately to his home to alleviate the suffering of his sick child. On inquiry Dr. Crawford was informed that the throat of the child was painful, and he offered to prescribe for it at once and call early in the morning.

The man, however, implored the doctor so pitifully to go with him without delay that Dr. Crawford finally yielded. On arriving at the house Dr. Crawford found the child suffering from an inflammatory condition of the throat, which was so mild in its nature that he was able, without compunction, to assure the father then and there that no significance need be attached to so slight an ailment.

The father of this child was no other than the renowned Dr. McFadon, who advertises in the most absurd and ridiculous manner his infallible ability to cure every disease, without regard to its character or severity. For the edification of the public, he circulates among them thousands of pamphlets describing some of the marvelous results which he has attained.

What do you think of this man who boldly approaches the sick bed without a trace of knowledge concerning the import and nature of the conditions he meets?

I requested Dr. Meunier to answer one last question—one concerning his methods of treatment in cases of fracture of the neck of the femur. He replied that his methods were similar to my own. On requesting him to describe these methods, he hesitated, but finally declared that a bandage about the hip joint, and rest in bed, comprised the Osteopathic *modus curandi*. I told him that I had expected this answer, but could not help feeling pity for the unfortunates who might be compelled to undergo such treatment, because of the inevitable shortening or possible uselessness of the limb. I added that it was not possible for me to comprehend why so large a number of young men and women should enter upon a life of systematic swindlery and deception at the sick bed, in view of the fact that it requires but a minimum amount of common sense to understand the quackery in such methods. Considering the enormous responsibility, I told him I was forced to regard the Osteopaths as the most vicious creatures on earth. In comparison with them Jesse James was an angel, for he made short work of his victims and did not prolong their misery, but the Osteopaths kill inch by inch.

I now requested Dr. Gamble to accompany us on our visits to every case in Le Claire. It happened that the first cases to be investigated were those under Osteopathic care, and Dr. Gamble asked Dr. Meunier's permission to see them. The latter declined, saying that no one in this country had ever been treated as shamefully as he had been that day. In case I would apologise he would grant Dr. Gamble's request. I told him that I believed I owed him no apology for telling the truth, and assured him that had our discussion dealt with any other subject I should, despite his delusion, have shown him all the respect that social laws demand; further, that in my report to the Iowa State Board of Health I should take into account the peculiarity of the circumstances. The result of this was that the permission was granted.

The two cases proved to be of some severity. The mother of the patients officiated as nurse. I questioned her concerning the number of treatments which the invalids had received, but was interrupted by Dr. Meunier with the

statement addressed to the woman—"You need not answer that question. These patients receive as many treatments as the science of Osteopathy regards necessary." In response to this I explained to Dr. Bailey that Dr. Meunier was dangerous to the community, especially to those inhabitants of Le Claire who are lacking in even that small amount of judgment required to discriminate between the false and the true in medicine. I ordered him, therefore, to be quarantined to avoid the possibility of his inoculating other individuals by rubbing the virus into their skins.

Report received and adopted.

CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEALTH

Dr. Conniff, on behalf of the delegates sent to the Richmond (Va.) meeting of the "Conference of State and Provincial Boards of Health of North America," presented a report of the meeting which was received, adopted and placed on file.

RABIES

Replying to a communication from a party relative to the alleged presence of rabies in some parts of the State, Dr. J. I. Gibson, chairman of the committee on "Diseases of Animals and Veterinary Sanitation," said:

Your committee, to whom was referred the communication of John Wagoner, Emeline, Iowa, enquiring what authority their township board could exercise in the control of dogs during a supposed outbreak of rabies, beg leave to report:

First.—That there is no positive knowledge of the existence of rabies in the vicinity referred to.

Second.—That in cases where rabies does exist the local board has power to establish quarantine upon dogs or other animals exposed to rabid dogs and to require the confinement or muzzling of all dogs in the township for a period sufficient to cover the stage of inoculation of the disease, and as long as any cases of rabies exist in the township.

Third.—That in cases where such quarantine or muzzling rules are proclaimed by the local board and dogs are still allowed to run at large, it is the duty of the local board to order such dogs running at large in violation of such rules shot on sight.

This report was received and adopted.

LINSEED OIL

The Secretary reported the action that had been taken by the President and Secretary of the Board, by and with the concurrence of the Governor, and asked for instructions as to his further duties—especially as regards the institution of prosecutions where adulteration is found.

Dr. Guilbert offered the following resolution, which was unanimously adopted:

Resolved, That whenever specimens of linseed oil are sent to this Board for examination, and are found on analysis to be adulterated, that then the Secretary is instructed, at once to notify the local inspector of oils, that such specimens of oil from his district have been found to be adulterated, and that it is his duty to proceed against the violators of the law in the proper court of the State.

Professor Macy submitted the following report, supplementary to report made by him and Mr. Pickell, at the last meeting of the board.

Iowa State Board of Health:

GENTLEMEN—The undersigned reported at last meeting, the results of certain tests of linseed oils. In the said report, the Mound City Paint Color Works was reported as having a sample of adulterated oil, because of the presence of a neutral drier. Later it was determined that such a drier was not, and is not an adulterant, and we gave a certificate to the company to the effect that the sample in question was O. K.

We make this report to your honorable body as a modification of our report now on file and above referred to.

Respectfully submitted.

S. R. MACY,
Chemist State Board of Health

Highland Park College, Des Moines, August 2, 1899.

The report was received and placed on file.

FINANCIAL.

The Secretary presented the following financial report, for the quarter ending July 31, 1899:

Board meeting, May 4, 1899

MEMBERS EXPENSE ACCOUNT.

E. A. Guilbert.....	\$ 25.20	
J. C. Shrader.....	18.76	
Warren Dickinson.....	10.50	
J. A. Scroggs.....	25.51	
W. Bancroft.....	24.96	
J. I. Gibson.....	23.58	
J. A. McKlveen.....	14.82	
H. Matthey.....	26.90	
R. E. Conniff.....	28.50	
Total.....		\$198.63
Paid by State warrant No. 8962.		

SPECIAL EXPENSE ACCOUNT.

J. A. Scroggs, Richmond meeting.....	\$ 75.65
Paid by State warrant No. 9317.	
E. A. Gilbert, Richmond meeting.....	86.20
Paid by State warrant No. 9501.	
R. E. Conniff, Richmond meeting.....	116.75
Paid by State warrant No. 9376.	

CURRENT EXPENSES FOR MAY.

J. F. Kennedy, Secretary.....	\$100.00
Margaret S. Schoonover, Stenographer.....	50.00
F. R. Conaway, printing <i>Bulletin</i>	27.45
L. Young, binding <i>Bulletin</i>	9.00

L. Schooler, postage.....	26.00
J. C. Schrader, investigating smallpox.....	55.47
J. A. McKlveen, investigating smallpox.....	12.50
Smith-Premier Co , 100 carbons.....	3.00
Iowa Telephone Co.....	.45
Western Union Telegraph Co.....	1.91
United States Express Co.....	1.25
Well-Fargo & Co's. Express.....	.68
Total.....	<u>\$287.71</u>
Paid by State warrant No. 9316.	

CURRENT EXPENSES FOR JUNE.

J. F. Kennedy, Secretary	\$100.00
Margaret S. Schoonover, Stenographer.....	50.00
J. A. Schroggs, consulting with Governor.....	13.33
F. R. Conaway, printing <i>Bulletins</i>	27.45
L. Young, binding <i>Bulletins</i>	9.00
Iowa Lithographing Co , 6,500 letterheads.....	28.00
Carter & Hussey, 10,000 wrappers, \$9, 300 large wrap- pers, \$1.50.....	10.50
D. Appleton & Co.....	5.00
Adams Express Co.....	2.79
American Express Co.....	1.79
United States Express Co.....	.89
Wells-Fargo & Co's. Express.....	.85
Haywood & Son, paper fasteners.....	.37
Total.....	<u>\$249.97</u>
Paid by State warrant No. 9733.	

The auditing committee reported as follows:

To the State Board of Health.—The auditing committee desire to submit their report upon the Secretary's financial statement for the quarter ending July 31, 1899. We have found proper vouchers filed for each and every expenditure; and the warrants drawn correspond with the vouchers filed.

Respectfully submitted,

WARREN DICKINSON,
H. MATTHEY.

The report was received and adopted.

AMERICAN PUBLIC HEALTH ASSOCIATION

Warren Dickinson, J. A. Scroggs, J. A. McKlveen and J. F. Kennedy were duly elected delegates to the annual meeting of the American Public Health association, to be held at Minneapolis in October *prox.*

DISINTERMENT PERMITS

Eight applications for special disinterment permits were presented by the Secretary, all the deaths having resulted from

"Croup" or Diphtheria. The applications were referred to the committee on "corpses," who reported in favor of granting the permits under the immediate supervision of the local boards of health of the respective localities, and in accordance with the provisions required by the State Board. The permits were granted.

The Secretary, on this subject, reported that, for the quarter ending July 31st, there had been issued one hundred and fifty ordinary permits.

On motion Board adjourned to meet Wednesday, November 15, 1899.

THIRD QUARTERLY MEETING—NOVEMBER, 1899

The State Board of Health met in regular quarterly session in the office of the Secretary, Des Moines, November 8, 1899, and was called to order at 10 A. M. by the President, Dr. J. A. Scroggs.

There were present Scroggs, Guilbert, Bancroft, Conniff, Shrader, and Matthey. Later Dr. McKlveen came.

The minutes of the Secretary were read and approved.

The report of the Secretary was presented, read, referred to the regular standing committees, and considered topically.

AMERICAN PUBLIC HEALTH ASSOCIATION

The Secretary reported the following respecting the meeting of the above named association, held at Minneapolis, Minnesota, October 31st, and November 1st, 2d, and 3d:

As one of your delegates to the American Public Health Association, I have to report that returning from there so short a time before this meeting your Secretary was not able to make out a formal report for your edification and consideration.

I hereby report the following, and if the Board will so direct, will prepare for the next issue of the BULLETIN a report that will be, in a measure, a resume of the transactions of the Association.

This Board was represented by Drs. McKlveen, Shrader, Gibson, and your Secretary. Iowa was further represented by Professor Hohenschuh, of Iowa City, and Dr. C. H. Sheldon, of Davenport. Prof. J. Fred Clarke, of Fairfield, Lecturer in Hygiene in the State University, was elected a member, and Prof. Floyd Davis was assigned to read a paper, but neither was present.

There were one hundred and twenty-two members enrolled as in attendance, in addition to one hundred and twenty-five who were elected as new members, Drs. McKlveen, Clarke, Sheldon and Professor Hohenschuh representing Iowa in the list of new members.

The session was a very busy one, the program being greatly overloaded, and in consequence no time even for the reading of the papers, much less for discussions. There would have been even less discussion had it not been for the persistent efforts of Dr. Gibson.

Dr. Shrader was elected to represent Iowa in the Advisory Council, and your Secretary as a member of the executive committee, and I had the assurance that Iowa would be remembered as well in the regular standing committees. Dr. P. H. Bryce, of Toronto, was elected President for the ensuing year; Dr. M. H. Bracken, Minneapolis, First Vice-President; Dr. Juan Breaña, Zacatecas, Mexico, Second Vice-President; Dr. C. O. Probst, of Ohio, Secretary; Dr. Henry D. Holton, of Brattleboro, Vt., Treasurer. Next place of meeting, Indianapolis, Ind.

The report was received and the Secretary was directed to prepare a report in full for publication in the BULLETIN.

NATIONAL BOARD OF HEALTH

Dr. Conniff reported the result of the interview at Dubuque of the special committee, consisting of himself and Drs. Scroggs and Guilbert, with Hon. Senator Allison and Hon. D. B. Henderson, relative to the establishment of a National Department or Bureau of Health along the lines suggested by Senator Spooner's bill.

BOVINE TUBERCULOSIS

Dr. J. W. Kime, of Ft. Dodge, appeared before the Board and gave a history of the efforts of the people of Ft. Dodge to determine the freedom of the dairy herds, supplying the city with milk, from Tuberculosis, and speaking in general of the great prevalence of this disease among cattle and the danger therefrom to consumers of milk.

On motion a special committee, consisting of Drs. Gibson, Conniff, and Shrader, was appointed to formulate some definite expression upon this subject for consideration by the Board at the meeting to be held February next.

INFECTIOUS DISEASES

The Secretary reported the following respecting infectious diseases:

With the exception of severe outbreaks of diphtheria at Oskaloosa and Clinton, the health of the State has been remarkably good since your last meeting.

Smallpox: October 9th, Dr. J. F. Herrick, health officer of Ottumwa, reported a case of smallpox in the person of an adult male who had been traveling over the country on a wheel, and hence the source of infection could not be definitely determined. He was broken out in papules when first seen and was at once removed to a hospital, about two miles in the country. No other cases have occurred, demonstrating the value of prompt preventive measures.

October 21st, Dr. C. W. Stewart, health officer of Washington reported a case of smallpox in that city, in the person of a railway mail agent, the terminal of whose route was Albert Lea, Minnesota. As they have been having quite an epidemic of the disease in southern Minnesota, including Albert Lea, the source of infection is quite evident.

As in the case at Ottumwa the disease was promptly recognized and strict restrictive measures were at once adopted. No other cases have occurred.

In both cases the beneficent efforts of both Boards were jeopardised by the local press in the interest of business, declaring the disease was chicken pox and thus weakening the hands of the health officers and minifying the importance of vaccination, quarantine and other preventive measures. It would seem that such publications, though intended as such, are not in the interest of economy or commercial prosperity.

BIENNIAL REPORT

The Secretary reported as follows respecting the Tenth Biennial Report.

The Tenth Biennial Report is now in the hands of the State printer. It will be a publication of interest because of the large range of subjects covered and the amount of information upon these subjects. Your secretary, in its preparation, has strictly followed the requirements of the code, and I believe your honorable body will find that it places before the legislature and the people of the state, in a practical and convincing manner, the important work delegated to the Board, as well as the satisfactory manner in which that duty is being met. It will contain about 400 pages, and several of the articles are well illustrated. There are several practical and important, as well as up-to-date, reprints from the most reliable sources. Under the topic, "Suggestions for Further Legislation," your Secretary has endeavored to present, as forcefully as possible, the great partiality and injustice of the Osteopathic law as compared with the medical practice act.

Respecting this communication from the secretary, Drs. Shrader and Matthey, on behalf of the Committee on Contagious Diseases, reported as follows:

MR. PRESIDENT AND GENTLEMEN OF THE STATE BOARD OF HEALTH.

Your committee to whom was referred that part of the secretary's report in relation to the publication of the Tenth Biennial report of the Secretary to this Board, and in regard to the appointment of a legislative committee would say: That we are delighted to be informed that our secretary has taken the pride and given it the thought and care so necessary to show to the legislature and the people of the state the valuable information here published, believing it will be a great factor in the education of the people in sanitary matters. We are of the opinion that a legislative committee should be appointed at this meeting who should at proper times, visit that board and see that no adverse action is taken and to inform the members of the work we are doing to prevent disease by removing the causes of sickness, quarantine, disinfection, and abating nuisances of many different kinds.

LINSEED OIL INSPECTION

The Secretary reported as follows relative to the inspection of linseed oil:

Quite a number of the samples of linseed oil sent to this office for inspection have been found adulterated, and have been reported to the County Attorney and the local Oil Inspector for prosecution. Your Secretary has been assured that several prosecutions have been, or will be commenced. In other cases the County Attorney or the Inspector has reported that the oil adulterated was not being offered for sale, or had not been sold for "linseed oil," or that the party was a man of great integrity and had no know-

edge that the oil was not up to grade, and that he had furnished the oil for inspection in order that he might for himself determine its character, and that he had, immediately upon learning that it was adulterated, reshipped the oil to the parties of whom it was bought. In all such cases the County Attorney and the Oil Inspector were reluctant to begin prosecution, and your Secretary felt that he had no right to involve the Board in any legal procedures under any such circumstances.

It may not be impertinent, and certainly is not irrelevant, for your Secretary to remark that this matter of testing linseed oil, and prosecuting adulterators thereof, is not the appropriate work of a sanitary body. It is a commercial transaction with but little, if any, sanitary significance whatever.

This act of the Twenty-seventh General Assembly, relating to the inspection of linseed oil, has, on practical test, proved contradictory and inefficient, and its enforcement well nigh impossible.

In reference to this item of the Secretary's report. Dr. Matthey, chairman of the committee on oil inspection, reported:

Your committee on oil inspection report that we have had under consideration the report of the Secretary in regard to this matter, and we are in accord with him in the conclusion that no prosecution should be insisted on when the local Inspector and the County Attorney believe that conviction could not be had. We also believe that the law should be so amended as to be less contradictory and more effective. The law should not place the enforcement of its provisions, further than the duty of determining the quality of the oil, upon the State Board of Health.

The report was adopted.

VACCINE VIRUS

The secretary said in his report relative to vaccination and supplying vaccine virus:

Your Secretary believes that if this office could order or supply on short notice vaccine virus from reliable laboratories to health officers and other physicians in the State, and advertise the fact in the BULLETIN, that vaccination would become much more general. This is done in some states, and is in the interest of better protection, because of the more general vaccination and the use of more reliable virus.

Your Secretary could make arrangements with several reliable establishments to furnish upon the shortest notice fresh virus, and in no way involve the Board in any financial responsibility. I append hereto some correspondence touching this matter for your consideration.

The committee on infectious diseases having this item under consideration reported the following, which was adopted:

Your committee, to whom was referred that part of the Secretary's report in relation to establishing an emporium for the sale

and distribution of vaccine virus, the same being under the supervision and care of the Secretary, this being done by some of the State Boards, have thought this matter over carefully and submitted the following:

The Board, as a board does not wish to engage in any commercial enterprises. We think it would at once antagonize every dealer in vaccine in the State, and they would assuredly bring all the influence they and their friends could bring to bear against the successful carrying out of the project.

But we are met with this statement in the report of the Secretary, that the Board authorize the Secretary to keep the virus on hand, and sell from this office the virus to physicians and others, such as local boards, and to whomsoever might apply. Your committee think that this would not materially help the matter, as this was being done by and with the sanction of the members of the Board. Again, should this be done, and if the project was successful, it would require the services of another clerk, for we are informed that the labors of the Secretary are becoming more onerous every year; and, besides, good, reliable virus can be obtained from Chicago almost as soon as it could from this office. Therefore, your committee cannot recommend the adoption of this part of the Secretary's report.

All of which is respectfully submitted.

J. C. SHRADER,

H. MATTHEY,

Committee.

The report was adopted.

DISINTERMENT PERMITS

The Secretary reported that during the quarter there had been issued from the office one hundred and thirty-five (135) ordinary disinterment permits in addition to the special ones authorized by the Board at its last meeting—a careful record of all these permits, whether ordinary or special, being kept in the office. He also laid before the committee on corpses, Dr. Bancroft, several additional applications for special permits, upon which the committee reported favorably, with the exception of one, which was laid over until the next meeting. The report of the committee was adopted, and the Secretary was directed to issue special permits in the following cases:

ROSETTA KELLEY, *membranous croup*, to be removed from one lot to another in Coon Rapids cemetery.

ROBERT H. THOMAS, *membranous croup*, to be removed from Shellburg cemetery, Benton county, to Evergreen cemetery in Vinton.

EARL RUSH HAVERLY, *croup*, to be removed from Woodland cemetery, Des Moines, to Odd Fellows cemetery, Marengo.

GRACE HURLBURT, *croup*, from a private lot near Boone to East Lincolnwood cemetery, Boone.

UNKNOWN CHILD, to be removed from Salt Creek township, Tama county, by private conveyance to Oak Hill Cemetery, Belle Plaine.

MAGGIE AUGUSTA MAGNUS, *diphtheria*, to be removed from Oak Hill cemetery, Cedar Rapids, to another lot in the same cemetery.

MANA BEUNABOSA, *diphtheria*, from one lot to another in Floyd cemetery, Sioux City.

JAMES BRAY, *diphtheria*, to be removed from the Catholic cemetery, Washington township, Dubuque county, to Key West cemetery, in the same county.

ADDIE I. HORNING, *diphtheria*, to be removed from one lot to another in Linwood cemetery, Boone.

A communication was presented from Mr. J. S. Harlan, secretary of the Atlantic Cemetery Association, asking in regard to granting certificates under certain specified conditions.

The Secretary was authorized to issue the permits upon application being made in each case in due form.

FINANCIAL

The Secretary presented the following financial statement for the quarter ending October 31st:

During the quarter the following amounts have been expended, the vouchers for which I submit herewith: Board meeting Aug. 2nd, 1899.

MEMBERS EXPENSE ACCOUNT

J. C. Shrader.....	\$ 17.98
E. A. Guilbert.....	30.65
J. I. Gibson.....	21.08
J. A. McKlveen.....	14.82
W. Bancroft.....	21.90
H. Matthey.....	19.00
R. E. Conniff.....	28.00
Warren Dickinson.....	10.40
J. A. Scroggs.....	22.90
Total ..	\$ 186.73

Paid by State warrant No. 10450.

CURRENT EXPENSES FOR AUGUST.

J. F. Kennedy, Secretary.....	\$ 100.00
Margaret S. Schoonover, Stenographer.....	50.00
F. R. Conaway, State Printer	44.45
L. Young, State Binder.....	9.00
H. Matthey, investigating small pox.	5.80
Carter & Hussy, printing circulars.....	3.75
Carter and Hussey, printing circulars.....	7.00
F. A. Dawson, express service.....	.75
Adams Express company.....	5.45
American Express company.....	.85
U. S. Express company.....	2.95

Wells Fargo & Company's express.....	2.15
Western Union Telegraph company.....	.59

Total..... \$ 232

Paid by State warrant No. 10844.

CURRENT EXPENSES FOR SEPTEMBER

J. F. Kennedy, Secretary.....	\$ 100.00
Margaret S. Schoonover, Stenographer.....	50.00
L. Schooler, bulletin postage.....	40.00
Conaway & Shaw, printing.....	27.45
L. Young, binding <i>Bulletin</i>	9.00
L. Schooler, stamps and envelops.....	203.79
Pub. Photo Engraving Company, electros.....	17.06
The Century company.....	13.50
W. C. Newton & Company, electros.....	9.45
W. P. Gerhard, books.....	6.00
G. F. Lasher, postal guide.....	2.00
Western Union Telegraph company.....	.68
Adams Express company.....	.60
American Express company.....	.65

Total..... \$ 480.

Paid by State warrant No. 11204

RECAPITULATION.

Members expense account.....	\$ 186.73
Expenses for August.....	232.74
Expenses for September.....	480.08

Total..... \$ 899.

The fiscal year closed with September 30th, and the amount expended was made to equal the amount appropriated.

The new fiscal year began October 1st, and the expenditures for that month are as follows:

CURRENT EXPENSES FOR OCTOBER.

J. F. Kennedy, Secretary.....	\$ 100.00
Margaret S. Schoonover, Stenographer.....	50.00
F. R. Conaway, State Printer.....	48.70
L. Young, State Binder.....	9.00
A. N. Marquis & Co., book.....	2.75
United States Express company.....	2.90
Adams Express company.....	.90
Wells, Fargo & Co's. Express, August.....	.50
Wells, Fargo & Co's. Express, September.....	.30
Western Union Telegraph company.....	.50

Total..... \$ 215.

Paid by State warrant No. 11730

Total expenditures for August and September as above stated.....		\$ 899.55
Expenditures for October.....		215.55
Total for quarter.....		\$ 1,115.10

The report was referred to the auditing committee, who reported as follows:

Your committee, to whom has been referred the Secretary's financial report for the quarter ending October 31, 1899, report that they have found proper vouchers filed for each and every item, and warrants drawn check with bills paid.

H. MATTHEY.

The report was received and adopted.

SMALLPOX AT STORM LAKE

While the Board was in session the secretary received the following telegram:

STORM LAKE, Iowa, November 8, 1899.

Dr. J. F. Kennedy:

A camp of graders are quarantined here on account of a case of small-pox, reported by Chicago, as the man arrived there October 31. This camp is ordered to Mississippi to-day. Ten days has elapsed since quarantine; shall I permit quarantine to be raised and allow passage through the state? No one sick in camp. Answer quick.

DR. L. M. JOHNSTON.

The Board directed the following reply:

L. M. Johnston, M. D., Storm Lake:

Vaccinate *all* persons known to be exposed, maintain quarantine seven-teen days from last exposure, and if, at the end of that time, no cases develop, release quarantine on order of local board of health.

By order

STATE BOARD OF HEALTH.

On motion, the Board adjourned to meet the first Wednesday in February, 1900.

FOURTH QUARTERLY MEETING—FEBRUARY, 1900.

The State Board of Health met in quarterly session February 7, 1900, and was called to order at 10 A. M. by Pres. Dr. J. A. Scroggs.

There were present Scroggs, Matthey, Bancroft, Conniff, McKlveen, Remley, Gibson, and Dickinson, Dr. Guilbert being absent because of severe illness.

The minutes were read and approved and the Secretary presented his report for the quarter ending January 31, 1900.

SYMPATHY FOR DR. E. A. GUILBERT

The following telegram, dictated by Dr. Conniff, was sent Dr. Guilbert:

"The Board, one and all, deeply regret your absence and join in sympathy with a prayer for your speedy return to health."

Later Dr. McKlveen presented the following resolution, which was unanimously adopted by a rising vote:

WHEREAS, This Board has learned with sadness of the serious illness of our colleague, E. A. Guilbert; M. D. Be it

Resolved, That the Board of Health, in session at Des Moines express our heartfelt sympathy to our esteemed colleague, Dr. E. A. Guilbert and most sincerely hope his life may be spared, and that he may be restored to his former state of health.

CIRCULARS

Circular No. 2, on the restriction and prevention of contagious diseases in the public and private schools of Iowa, as revised and reissued, was declared official.

COMMUNICATIONS

An invitation was received from President Rearick, of Highland Park College, inviting the Board to visit the laboratories of the institution. The invitation was respectfully declined, owing to the pressure of business and the brevity of time.

Other communications were received and referred to Dr. Conniff, special committee, *vice* Dr. Guilbert, who reported as follows:

Your Committee on Communications beg to report as follows:

In the letter of Joe. E. Blackburn, President of Pure Food and Drug Congress, asking the Board to send representatives to the next meeting to be held in Washington, D. C., March 7, 1900. Your committee believes it to be a part of the work of the Board to lend its influence to the praiseworthy effort to secure proper legislation along this line, and would suggest that two delegates be named to attend the Washington meeting.

The communication from Mr. Junkin, chairman of the Committee on Retrenchment and Reform of the senate, asking information on the needs of the Board and the expense of clerical service for the biennial period:

Your committee would recommend that the president and secretary be instructed to put the information in the hands of the committee without delay.

In the matter of the communication from his excellency, the governor, stating that the writer had been appointed to succeed himself as member of the Board: Your committee finds the Board is entitled to a great deal of credit for their kind forbearance in the past, for overlooking his mistake.

and for extending to him at all times uniform courtesy and kindness, and the writer wishes to thank you one and all for your many acts of friendship and consideration.

Your committee learns with sorrow of the severe illness of our friend and colleague, Dr. Guilbert, and would recommend that a copy of the resolutions passed by the Board at our morning session be sent to the good doctor, together with a draft for his quarterly fees in the Board of examiners.

The letter of D. A. King, chief statistician of the Twelfth United States census, endeavoring to secure as far as practicable, uniformity of form in reports of vital statistics: Your committee would recommend the adoption of the forms recommended by the national government and the Secretary be instructed to furnish to the auditor blanks in conformity with this recommendation.

In the communication of F. W. Peck, Commissioner-General of the Paris Exposition asking the Board if space is wanted in the official catalogue of the exposition:

Your committee make no recommendations.

INFECTIOUS DISEASES

The Secretary reported outbreaks of infectious diseases in various localities in the State as having been reported during the quarter.

The diseases reported were Diphtheria, Scarlet Fever, Typhoid Fever, Smallpox and Whooping Cough. Those reported in November and December were reported in the BULLETIN of December and January while those reported for January will be found elsewhere in this issue of the BULLETIN.

The Secretary said in conclusion upon this subject:

Notwithstanding the large number of points of incidence and the many exposures, especially to Smallpox, in many of the localities there have been no epidemics and comparatively few of those exposed have contracted the disease, because of previous vaccination, re-vaccination, quarantine and isolation.

The committee to whom was referred this part of the Secretary's report, reported as follows:

Your Committee on Contagious Diseases, to whom was referred the report of the Secretary respecting outbreaks of these diseases, respectfully report that we have duly considered the same, and while we regret that these infectious diseases have appeared in so many localities we congratulate the various local boards on their prompt and successful efforts in preventing their extension and their assuming epidemic proportions. These boards are the duly appointed defenses of the people in such matters and we are glad to note the fact that they are so faithfully discharging their duties in so many localities. We hope in the near future there will be so hearty co-operation between the people, physicians and these local boards that such diseases will be immediately stamped out upon their appearance.

J. C. SHRADER.

H. MATHEY.

TUBERCULOSIS

The special committee on the preparation of a circular information upon Tuberculosis made the following report, which was adopted:

Your committee asks time until next meeting of the Board to present circular for publication, which will be in harmony with laws which must then be in force in Iowa, and the scientific facts developed up to the date of said meeting.

(Signed)

J. I. GIBSON,

R. E. CONNIFF,

J. A. MCKLVEEN,

Special Committee on Circular Relating to Tuberculosis.

IOWA STATE SANITARY ASSOCIATION

At the organization of this association a special committee was appointed, with Dr. Gibson as chairman, for the purpose, if possible, of having the State Board of Health publish as a supplement to the *Bulletin* the papers and discussions before the association.

The chairman, after consulting with the Board, presented the following report, which was adopted:

Your committee finds that the proceedings of the first meeting of the Iowa State Sanitary Association are so voluminous as to prohibit the publication of same in the *Iowa Health Bulletin*. Your committee recommends that the publication of said proceedings be referred back to the president of the Iowa State Sanitary Association, with the hope that said association will endeavor to raise the necessary funds to publish a yearly volume containing all its proceedings.

(Signed)

J. I. GIBSON.

DISINTERMENT PERMITS

The Secretary was directed to issue the following special disinterment permits:

CHARLES BENNETT, died in 1894, *Croup*; by private conveyance from Butler cemetery, Harrison township, Lee county, to Farmington cemetery, Farmington township, Van Buren county.

ROY BENNETT, died in 1894, *Diphtheria*; disinterment, and removal same as above.

WILLARD G. BROWN, died 1884, *Croup*; by private conveyance from Davenport cemetery to West Davenport cemetery, Rockingham township, Scott county.

MAGGIE HEATON, died 1878, *Croup*; by private conveyance from Riverside cemetery, Fremont county, to Randolph cemetery, Riverside township, Fremont county.

BERTHA MAY ICKES, died 1887; by private conveyance from Oakdale cemetery, Davenport, to another lot in the same cemetery.

ALVIN VARIS, died 1874, *Scarlet Fever*; by railroad from Arcadia township, Carroll county, to Woodland cemetery, Des Moines.

FINANCIAL

The Secretary presented the following financial statement for the quarter ending January 31, 1900:

Board meeting, November 8, 1899.

MEMBERS EXPENSE ACCOUNT

E. A. Guilbert.....	\$ 32.90
A. A. McKlveen.....	12.82
R. E. Conniff.....	31.50
H. Matthey.....	22.50
C. Shrader.....	16.66
W. Bancroft.....	23.46
A. Scroggs.....	23.56
Total.....	\$ 163.40

Paid by State warrant No. 11872.

SPECIAL EXPENSE ACCOUNT

F. Kennedy, Minnesota meeting.....	\$ 26.95
Paid by State warrant No. 11873,	
C. Shrader, Minnesota meeting.....	29.50
Paid by State warrant No. 11874.	
A. McKlveen. Minnesota meeting.....	36.55
Paid by State warrant No. 11875.	
I. Gibson, Minnesota Meeting.....	33.18
Paid by State warrant No. 11960.	
Total.....	\$ 126.18

CURRENT EXPENSES FOR NOVEMBER

F. Kennedy, secretary.....	\$ 100.00
Margaret S. Schoonover, stenographer.....	50.00
P. R. Conaway, State printer.....	39.45
J. Young, State binder.....	9.00
F. Kennedy, trans. A. P. H. A.....	15.00
angan Bros.. stationery.....	5.73
terior Decorating company.....	5.00
R. E. Conniff, telegrams and express.....	3.20
F. Kennedy, street car fare.....	2.90
abyhood Publishing company.....	1.00
hoto Engraving company, express.....	.40
es Moines Book and Stationery company.....	.60
adams Express company.....	1.50
merican Express company.....	1.10

United States Express company.....	2.16
Western Union Telegraph company.....	1.40

Total.....

\$ 2

Paid by State warrant No. 12331

CURRENT EXPENSES FOR DECEMBER

J. F. Kennedy, secretary.....	\$ 100.00
Margaret S. Schoonover, stenographer.....	50.00
F. R. Conaway, State Printer.....	27.45
L. Young, State Binder.....	9.00
R. E. Conniff, smallpox, Storm Lake.....	43.05
R. E. Conniff, smallpox, Doon.....	9.94
J. A. McKlveen, smallpox, Coalfield.....	8.21
J. A. McKlveen, smallpox, Corning.....	8.80
J. C. Shrader, smallpox, Northwood.....	12.20
Smith Premier Typewriter company, supplies.....	1.70
Munn & Co., <i>Scientific Supplement</i>	5.00
<i>Popular Science News</i>	1.60
Adams Express company.....	.45
United States Express company.....	1.40
Western Union Telegraph company.....	4.41

Total.....

\$ 28

Paid by State warrant No. 28321

CURRENT EXPENSES FOR JANUARY, 1900

J. F. Kennedy, Secretary.....	\$ 100.00
Margaret S. Schoonover, Stenographer.....	50.00
J. A. McKlveen, small pox.....	12.50
J. A. McKlveen, small pox.....	2.80
Lewis Schooler, postage stamps.....	10.00
Carter & Hussey, printing wrappers.....	11.50
Iowa Lithographing company, letterheads.....	5.00
Bausch & Lomb Optical company.....	1.00
W. Horace Hoskins, <i>Veterinary Journal</i>	3 00
Adams Express company.....	1.26
American Express company.....	1.23
United States Express company.....	.84
Western Union Telegraph company.....	1.18

Total..... \$ 200.37

Paid by State warrant No. 13694

RECAPITULATION

Expended during the quarter.....	\$1,011.80
Expended during October, 1899.....	215.55

Expended for fiscal year.....\$1,227.35

Amount of appropriation unexpended.....\$ 3,772

The report was received and referred to the Auditing Committee.

The Auditing Committee, to whom was referred this report, submitted the following :

The Auditing Committee submit the following report upon the Secretary's financial statement for the quarter ending this date. We find proper vouchers filed for all monies expended, and warrants drawn check with receipted bills attached.

Respectfully submitted,

WARREN DICKINSON,
H. MATTHEY.

The report was received and adopted and the statement placed on file.

Professor Macy, Chemist for the Board, presented a bill for forty-four dollars for chemical analysis of linseed oil as directed by the Board. The bill was allowed and ordered paid.

On motion the Board adjourned to meet the first Wednesday in May unless ordered otherwise by the President.

ANNUAL MEETING—MAY, 1900

The Iowa State Board of Health met in annual session at the office of the Secretary, Capitol, May 15, 1900, and was called to order by the President, Dr. J. A. Scroggs, Keokuk.

There were present, Scroggs, Bancroft, Shrader, McKlveen, Matthey, Conniff, Gibson, and Dickinson.

The Secretary presented to the Board an official notification from the Governor of the appointment of Dr. Charles B. Adams, of Sac City, as the successor of Dr. E. A. Guilbert, deceased. Dr. Adams being present was duly recognized, his name enrolled as a member, and he at once entered upon his duties as such.

The minutes of the meeting of the Board, held February 7th-8th, were read and approved as correct.

THE SECRETARY'S REPORT

The Secretary read his report for the quarter ending April 30th, which was received and considered topically.

MEMORIAL

The first item was a reference to the death of Dr. E. A. Guilbert, which took place since last meeting. A special committee

was appointed to draft a suitable memorial, consisting of Shrader, McKlveen and Bancroft, and May 16th at 11:30 A.M. set apart for a memorial service.

At the time appointed tender tributes to the memory of Guilbert were made by the different members of the Board by the Secretary. In lieu of a report from this committee following memorial, prepared by the the Secretary, and published in the HEALTH BULLETIN was adopted as the sentiment of the Board, and was ordered spread upon the minutes of the Board and a copy thereof furnished to his family:

Memorial

Edward Augustus Guilbert

Born June 12th, 1826.

Died March 4th, 1900

DR. GUILBERT was born in Watertown, Jefferson county, New York. Attended the public schools and the Black River Institute at Watertown. Removed in 1837, with his father's family, to Chicago. Graduated from Rush Medical College, Chicago, in 1847. Practiced his profession first at Ottawa and later at Waukegan, Illinois. About 1825, he adopted Homeopathy as his system of practice and removed to Elgin, Illinois, where he remained until his removal to Dubuque in 1857. From 1852 to 1865 he was surgeon of the board of enrollment for the third congressional district. He was chosen Captain, Co. A, 46th Iowa Volunteer Infantry, and in that capacity served five months in western Tennessee.

The Doctor was married in 1847 to Miss Kathleen Somers, who survives him, and by whom he had nine children, all of whom are dead except his son Guy and a married daughter, Mrs. Daykin, of Nashville, Tennessee.

Dr. Guilbert was very prominent in Masonic circles, having been connected with the order for half a century and having been advanced to the Thirty-third Degree, a distinction, it is said, enjoyed by only two other Iowa men. He was also a prominent writer upon Masonic matters, and editor of the "Evergreen." He was prominent as a member of the Grand Army of the Republic and was several times commander of Lookout Post, Dubuque, of which he was one of the organizers.

Dr. Guilbert was appointed a member of the State Board of Health by Governor Horace Boies January 31st, 1890, and was after seven years of faithful service appointed by Governor Francis M. Drake to succeed himself. His connection with this Board and the State Board of Medical Examiners covered a period of ten years, and he was promoted to the presidency of both Boards. During all the time of his service on these Boards he missed but one or two of the meetings, which are held quarterly. He was enthusiastic in his devotion to the sanitary and hygienic interests of the State. His learning, observation and experience were always devoted to his official duties. He was a frequent and very acceptable contributor to the Iowa Health Bulletin as "Soliped," and his presence was always an inspiration and aid to the Board at its meetings. There is not a member of the Board but regards his departure as a personal loss.

He was a man of fine literary ability, of extensive culture, a fluent writer and an eloquent speaker.

His remains were interred in Linwood cemetery, Wednesday, March 7th, with impressive ceremonies, conducted under the auspices of the Masonic Fraternity and the Grand Army of the Republic.

Sleep, brother, sleep! sweet be thy rest,
Thy conflicts and thy toils are o'er.

INFECTIOUS DISEASES

The Secretary reported as follows respecting smallpox as having occurred in the State since last meeting.

There have never been in the history of Iowa so many outbreaks of smallpox in the State. The points of incidence for February and March were published in the BULLETIN of March and April. During April it appeared in the following localities: Grant township, Hardin county; Taylor township, Marietta township, and Liberty township, Marshall county; Marshalltown; Saylor township, Polk county; Des Moines; near Hansell; St. Anthony; Grinnell; Davenport; Oskaloosa; Toledo; Fort Dodge; Avery; Highland township, Palo Alto county; Adams township, Dallas county; Burlington; Cedar Rapids; Leon; Mt. Zion; Ottumwa; Cresco; Gowrey township, Osceola county; Jack Creek township, Emmet county; Corwith and Waterloo. During the quarter the disease appeared in thirty-eight different counties as follows: Monona; Boone; Clinton; Warren; Worth; Polk; Mills; Muscatine; Greene; Harrison; Madison; Osceola; Webster; Story; Sioux; Carroll; Hardin; Marshall; Hamilton; Franklin; Washington; Monroe; Woodbury; Scott; Palo Alto; Poweshiek; Mahaska; Tama; Dallas; Decatur; Des Moines; Van Buren; Linn; Wapello; Howard; Emmet; Hancock, and Black Hawk. In a number of these counties there were outbreaks at several points. I am unable to report the number of deaths or the results as to recovery, etc., as these data will not be reported until later. Your Secretary visited several points in person—in all cases to settle disputes as to diagnosis. It is a source of regret that the disease has appeared at many points, and has spread at other points through the obstinacy or incompetency of physicians. This is notably the case as regards Fraser, in Boone county, Lamoni, in Decatur county, and Muscatine. There will be laid before you some correspondence relating to this feature of the outbreak.

The Committee on Contagious Diseases reported as follows upon the above and accompanying communications:

Mr. President and Gentlemen of the Iowa State Board of Health:

We, your Committee on Contagious Diseases, to whom was referred sundry communications, beg leave to submit the following report:

I. In regard to the communication of Mr. A. D. Brown, of Manchester, Iowa, would say that we are pleased with the manner in which the case of scarlet fever was treated and the disinfection of the premises, private burial, etc., but according to Rule 10 of Regulations for Quarantine and

Disinfection, the quarantine should not have been raised, nor the man and his wife allowed to go at large until the full seventeen days had expired.

II. In regard to the outbreak of smallpox at Fraser, Boone county, Iowa, would recommend that they strictly obey the rules and regulations of the State Board of Health in regard to contagious diseases; that strict and efficient quarantine and isolation of all persons who have been exposed, be maintained; that all persons who have not been recently vaccinated, or cannot show the results of successful vaccination, should be vaccinated at once; that if any person disobeys the rules of the Board, he should be arrested and punished, and further, if the people of Fraser disobey these rules and persist in coming to Boone, that the mayor of Boone maintain a strict quarantine against Fraser, or any other point where he may have reason to believe that they are endangering the health and lives of the people of Boone.

III. We would urge that the committee appointed to prepare a circular of information on tuberculosis, for general distribution, report not later than at the August meeting.

IV. Owing to the widespread dissemination of smallpox in Iowa, the appointment of a committee to prepare a circular of information containing instruction for the diagnosing of the disease by the laity, as well as by physicians, to give information as to the most approved care of such patients, and full information in regard to vaccination, quarantine, isolation and disinfection, not only of the patients but of the premises where they were confined, after death or recovery.

V. In regard to the communication from the mayor of Eldora. We would recommend that a strict quarantine be maintained, of all persons and places where smallpox exists, and also of those who have been exposed, whether in Eldora or elsewhere; and quarantine against any or all points considered dangerous to the health and lives of the people.

(Signed) J. C. SHRADER,
H. MATTHEY.

The report was received and adopted.

The Secretary reported the following in regard to

GASOLINE LAMPS

"The late General Assembly has made it the duty of the Board to regulate the use of gasoline as an illuminant, laying upon your honorable body the duty of determining the lamps or appliances by which this fluid may be used with safety. There has been a large amount of correspondence on this subject and it is greatly desired that not only some definite action shall be taken by your body at this meeting, but that several parties may be allowed to present their respective lamps. It might be well to have a standing committee to test these lamps in the interim of the meetings and report to the next meeting its findings. Your Bacteriologist, Chemist and Secretary, all living in Des Moines, might constitute such committee.

The following form of a certificate of approval of lamps is respectfully submitted for your adoption :

IOWA STATE BOARD OF HEALTH, }
OFFICE OF SECRETARY.

DES MOINES, 19..

This is to certify that at a meeting of the Iowa State Board of Health, held on the day of 19..., an examination and test of the particular design, mechanism, workmanship, and safety of a lamp for the use of gasoline as an illuminant, submitted by and known as the , was made.

Pursuant to an amendment of section two thousand, five hundred and eight of the code, made by the Twenty-eighth General Assembly, relating to the use of the products of petroleum for illuminating purposes, it was ordered by the said Board that the use of said lamp in the State of Iowa be permitted.

.....
Secretary

REPORT OF COMMITTEE ON OIL INSPECTION AND INSPECTION OF GASOLINE

Your committee, to whom was referred the inspection of gasoline lamps as required by law, begs leave to report that after careful consideration it is deemed necessary that this Board appoint a special committee, whose duty it shall be to inspect and test all gasoline lamps offered for sale in Iowa; and to the manufacturers or agents of such lamps as are found to be safe for use as illuminators a certificate of approval shall be issued by this Board. The form of said certificate is attached hereto. The special committee will report the results of the examination of gasoline lamps to this Board at this and the future meetings. Your committee further recommends that Warren Dickinson, S. R. Macy and Eli Grimes be appointed as the special committee on inspection of gasoline lamps.

H. MATTHEY,
J. I. GIBSON,
Committee.

Adopted, and a special committee appointed who reported as follows:

Your committee to whom was referred the question of the safety of the gasoline lamps presented for inspection to the State Board of Health, report that they have examined the same but are not fully prepared to say they are entirely safe for use, and we ask for further time to more fully investigate this important matter.

(Signed) WARREN DICKINSON,
S. R. MACY,
ELI GRIMES,
Committee.

Upon the receipt of the report Dr. Shrader offered the following motion, which was duly carried:

WHEREAS, Chapter sixty-two of the acts of the Twenty-eighth General Assembly authorized the use of gasoline lamps, and provides that this Board shall decide as to the safety of such lamps, and

WHEREAS, We find by the report of the committee appointed by this Board to determine the safety of certain lamps presented, that said committee is not able to recommend any lamps presented thus far, and ask time for further tests, therefore, I move that this matter lay on the table for further investigation, that the committee be continued so as to pursue their investigations during the interim of the meeting of the Board, with power to act, and that they be authorized to ask the opinion of the Attorney-General on any point of the law relating to this matter not clearly understood by them.

FINANCES

The Secretary submitted a financial statement showing the expenditures for the quarter ending April 30th to be one thousand eighty-three dollars and seven cents. The amount of the appropriation previously expended, beginning with October, 1899, was one thousand two hundred twenty-seven dollars and sixty-five cents, making the total expenditures to date two thousand three hundred ten dollars and seventy-two cents, leaving an unexpended balance of two thousand six hundred eighty-nine dollars and twenty-eight cents.

The report in detail is as follows:

MEMBERS' EXPENSE ACCOUNT--FEBRUARY MEETING (1900).

H. Matthey	\$ 24.70	
W. Bancroft.....	23.36	
J. C. Shrader.....	13.67	
J. A. McKlveen.....	14.82	
J. I. Gibson	21.08	
R. E. Conniff.....	31.75	
W. Dickinson.....	11.00	
J A. Scroggs.....	25.06	
Total		\$ 165.64
Paid by State warrant No. 13795.		

CURRENT EXPENSES FOR FEBRUARY, 1900

J. F. Kennedy, Secretary.....	\$100.00	
Margaret S. Schoonover, Stenographer.....	50.00	
F. R. Conaway—		
Printing 6,000 <i>Bulletins</i> (January).....	\$ 28.00	
Printing 2,000 circulars.....	13.50	
Printing 6,000 <i>Bulletins</i> (February).....	27.45	
Printing 2,000 Regulations (No. 1)	27.00	
		95.90
L. Young—		
Binding 2,000 Regulations (No. 1).....	\$ 3.00	

Binding 6,000 <i>Bulletins</i> (January).....	9.00	
Binding 6,000 <i>Bulletins</i> (February).....	9.00	
		21.00
J. C. Shrader, investigating smallpox.....		25.74
J. C. Shrader, investigating smallpox.....		20.88
R. E. Conniff, investigating smallpox.....		4.13
<i>The Sanitarian</i> (1900).....		4.00
Langan Bros., ink.....		.50
Baker, Trisler company, ink.....		.63
Western Union Telegraph company.....		2.04

Total \$ 324.8

Paid by State Warrant No. 14588.

CURRENT EXPENSES FOR MARCH, 1900

J. F. Kennedy, Secretary.....	\$100.00
Margaret S. Schoonover, Stenographer.....	50.00
F. R. Conaway, printing 6,000 <i>Bulletins</i>	27.45
L. Young, binding 6,000 <i>Bulletins</i>	9.00
J. F. Kennedy, funeral services of Dr. Guilbert.....	18.40
L. Schooler, postage stamps.....	10.00
S. R. Macy, chemical analyses	44.00
R. E. Conniff, investigating smallpox.....	4.95
R. E. Conniff, investigating smallpox.....	5.61
<i>Domestic Engineering</i> (1900).....	2.00
Langon Bros., stationery.....	.80
Adams Express company.....	.25
Western Union Telegraph company.....	1.87

Total \$ 274.8

Paid by State Warrant No. 15566.

SPECIAL EXPENSES FOR MARCH, 1900

J. C. Shrader, attending meeting at Washington.....	\$ 90.8
Paid by State Warrant No. 15091.	

CURRENT EXPENSES FOR APRIL, 1900

J. F. Kennedy, Secretary.....	\$100.00
Margaret S. Schoonover, stenographer.....	65.00
F. R. Conaway, printing 6,000 <i>Bulletins</i>	27.45
L. Young, binding 6,000 <i>Bulletins</i>	9.00
R. E. Conniff, investigating smallpox.....	12.82
R. E. Conniff, investigating smallpox.....	4.91
Adams Express company.....	.22
American Express company.....	1.00
United States Express company.....	.25
Western Union Telegraph company.....	7.40

Total \$ 228.8

Paid by State Warrant No. 209.

RECAPITULATION

Members expense account.....	\$165.64
Current expenses, February.....	324.82
Current expenses, March.....	274.33
Special expense account	90.23
Current expenses for April.....	228.05
<hr/>	
Total for quarter.....	\$1,083.07
Amount previously expended.....	1,227.65
<hr/>	
Total expenditures... ..	\$2,310.72
Amount unexpended	2,689.28

The Auditing Committee, to whom this report was referred, reported as follows:

The undersigned Auditing Committee for the State Board of Health hereby certify that we have carefully audited the report of the Secretary as above given and find the same to be correct, and that proper vouchers are on file verifying each item of expenditure.

(Signed) WARREN DICKINSON,
H. MATTHEY.

The report of the Committee was received and adopted and ordered placed on file.

PURE FOOD AND DRUG CONGRESS

Dr. Shrader made an interesting report of the transactions of this congress held in Washington city. The report was received and ordered published in the *Bulletin*, and will be found elsewhere in this issue.

TRANSPORTATION OF CORPSES

An interesting communication from Prof. Hohenschuh, of Iowa City, was presented by Dr. Shrader, relating to embalmers and to the transportation of corpses, and making suggestions as to a better practical enforcement of the rules and regulations relating to this subject. The communication was referred to the committee on corpses—Dr. Bancroft, who subsequently reported the following which was adopted:

To the Iowa State Board of Health:

GENTLEMEN:—Your committee to whom was referred the communication of Mr. Hohenschuh, relative to the transportation of dead bodies, respectfully report as follows:

That every undertaker in the state of Iowa who has no license from the State Board of Health be required in every case to make affidavit that he has followed the rules under which he can ship. In order to distinguish the cases as to their preparation those who have permits to should ship all cases

under the yellow paster and if there is any violation of the rules in these cases the permit can be revoked.

In all cases the time of death as well as the time of shipment must be given so that the time limit may be decided on.

The general baggage agent of each road in Iowa should instruct their agents that the rules must be strictly followed, and that particular attention should be directed to those cases that are shipped under the white paster.

The express companies must also be reminded that the double fare that they charge for these cases does not absolve them from the rules of this Board.

In all cases where it is desired to check bodies through to points of destination on any line of the railroad, such bodies shall be prepared under the yellow paster, which will be guarantee of safety.

Every baggage man in the State, and every officer who issues transportation permits should be furnished with a list of licensed embalmers of the State and each licensed embalmer should also have such list for reference.

Respectfully submitted,

(Signed) W. BANCROFT.

The Secretary reported the following respecting

DISINTERMENT PERMITS

There were issued since the last meeting of the Board eighty-three disinterment permits, six of which were special permits approved by the Board at the last meeting. There is now on file for your consideration the following applications for *special* permits:

BLANCHE DONAHUE—Died 1892; *diphtheria*; by private conveyance to another lot in same cemetery.

MAUD DONAHUE—Died 1892; *diphtheria*; by private conveyance to another lot in same cemetery.

JOHN DRAKE—Died 1880; *diphtheria*; from Tipton township, Hardin county, to Radcliffe, same county.

JAMES COOLIDGE—Died 1880; *diphtheria*; by private conveyance from Concord township, Hardin county, to Radcliffe, same county.

THOMAS DRAKE—Died 1880; *diphtheria*; by private conveyance from Tipton township, Hardin county, to Radcliffe, same county.

MAUD HARRISON—Died 1890; *diphtheria*; from Cromwell, Union county to Afton cemetery, same county, by private conveyance.

MARTHA C. HINRICHSSEN—Died 1887; *diphtheria*; by private conveyance from Davenport, Scott county, to Oakdale cemetery, same county.

JARIE KACER—Died 1895; *diphtheria*; Oak Hill cemetery, Cedar Rapids, Linn county, to Bohemian cemetery, same county, by private conveyance.

ELSIE SCHLAPKOHL—Died 1889; *membranous croup*; by private conveyance from City cemetery, Davenport, Scott county, to W. Davenport, cemetery, same county.

The committee on corpses reported in favor of granting the permits and the report was adopted and the special permits issued.

CADAVERS

The Secretary called attention to the law passed by the Twenty-eighth General Assembly, relating to furnishing bodies for dissecting to medical colleges and others under conditions named in the act, and that the duty of distributing this material was imposed upon the Secretary, under such rules and regulations as may be adopted by the State Board of Health.

Dr. J. A. Scroggs, with the Secretary, was directed to formulate these rules and to report them to the Board at its next meeting, with power to act.

SMALLPOX AT BAXTER

There being quite a good deal of discussion as to the conditions at Baxter and a request being made to have an investigation as to the character of the disease and the measures of protection adopted, Dr. Shrader was directed to visit the place and render such assistance as seemed required.

ELECTION OF OFFICERS

The following were elected for the ensuing year:

President, John C. Shrader, M. D., Iowa City.

Secretary, J. F. Kennedy, M. D., Des Moines.

Stenographer, Margaret S. Schoonover, Des Moines.

Chemist, Prof. S. R. Macy, Des Moines.

Bacteriologist, Eli Grimes, M. D., Des Moines.

Delegates to the conference of State and Provincial Boards of Health of North America, at Atlantic City, Drs. Shrader, Scroggs and Conniff.

SECRETARY'S OFFICE

The following resolution was passed:

Resolved, That the Executive Council be respectfully requested to make such arrangements respecting the rooms of the State Board of Health as will enable the Secretary to have the books, supplies, reports, documents, etc., of the Board properly taken care of.

STANDING COMMITTEES.

Auditing—Dickinson, Matthey.

Communications—Scroggs, Bancroft.

Contagious Diseases—Matthey, Adams.

Corpses—Bancroft, Conniff.

Diseases of Animals and Veterinary Sanitation—Gibson, McKlveen.

Disinfection—Grimes.

Food and Water—Conniff, McKlveen, Adams.

Gasoline Lamps—Dickinson, Grimes, Macy.

Legislation and Legal Enforcement—Remley, Scroggs.

Library and Printing—Adams, McKlveen.
Oil Inspection—Scroggs, Adams, Gibson.
Plumbing and Ventilation—Dickinson.
Publications and Rules—Remley, Conniff.
Schools—McKlveen, Scroggs, Adams.
Sanitary Analyses—Macy.

On motion the Board adjourned to meet on the First Wednesday in August, unless otherwise ordered by the President.

SECOND QUARTERLY MEETING—AUGUST, 1900.

The Iowa State Board of Health met in regular quarterly session in the Capitol building, August 1st, 1900, and was called to order by the President, Dr. J. C. Shrader, at 11 A. M.

There were present Shrader, Gibson, McKlveen, Matthews, Adams, Scroggs, Bancroft, Conniff, Dickinson, and Remley.

The minutes of the last regular and the special meeting were read and approved.

Dr. Gibson moved that 2 P. M. to-morrow (August 2d) be apart for the examination and for action upon gasoline lamps. Carried.

On motion Board adjourned until 9 A. M. Wednesday, August 2d.

WEDNESDAY, AUGUST 2D

Board reconvened as per adjournment, President Shrader in the chair.

There were present Shrader, Bancroft, McKlveen, Adams, Scroggs, Gibson, Matthey, Conniff, Dickinson, Remley.

The rules adopted at the last meeting relative to the consideration of lamps presented for approval were readopted and enforced at this meeting.

GASOLINE LAMPS

The board proceeded to the examination, by test and otherwise, of certain lamps as to their safety, as contemplated by law.

The following lamps were recommended by the committee, duly examined by the Board and their use permitted in the state:

"New Century Lamp No. 50," "The Rockford X Ray," "The Omaha Automatic Gas Lamp," "The Standard Gas Lamp," "The Columbian," and "The Imperial Lamp."

At the previous meeting of the Board the use of three other lamps was permitted by the Board, viz: "The Welsbach Hydrocarbon Incandescent," all styles; "The M. & M. Arc," two styles, one for store and one for street, and the "No. 5 Special."

It is to be understood that the Board does not issue guarantees of safety for any of these lamps and does not specially commend any one as more than reasonably safe under proper care.

No lamp not having this approval by the Board, after due test and consideration, can be used in Iowa without violating the law and subjecting those using them to severe penalties.

LIGHT SYSTEMS

Some systems of lighting where two or more lamps were supplied with gasoline from one reservoir, and where the reservoir thus serving is placed in the apartment to be lighted, were presented at this as at the previous meeting. The Attorney-General gave it as his opinion that the State Board of Health had jurisdiction in such cases—that such systems of lighting can only be used when the vapor is generated in a tank or reservoir placed *outside* of the room or building to be illuminated.

The following motion, offered by the Attorney-General at the last meeting and duly approved, was reiterated at this meeting: "Moved that the Secretary be instructed to inform the manufacturers of such plants that this Board has no jurisdiction to determine the safety of gas plants—that under the statute the use of gasoline is prohibited in all such plants, unless the vapor is generated in closed reservoirs outside of the building to be illuminated." Carried.

TUBERCULOSIS

The committee on tuberculosis reported a form of circular of information which was adopted, and the Secretary was authorized to have an edition of 10,000 copies printed for free distribution.

SECRETARY'S REPORT

The report of the Secretary was read and referred to appropriate standing committees. As showing the decline in smallpox, he stated that during the quarter ending July 31st there were reports of outbreaks of smallpox in thirty-seven localities in Iowa, of which eighteen occurred in May, twelve in June and only seven in July. There were comparatively few reports of

diphtheria and scarlet fever. Typhoid fever has been prevalent at several points.

DISINTERMENT PERMITS

The Secretary reported, "there have been issued from this office, in addition to the *special* disinterment permits authorized by the Board at its last meeting, one hundred and seventy-three permits, as follows: In May, ninety-three; June, fifty-nine; July, twenty-one."

He laid before the Board applications for special permits, as follows:

1. To disinter and ship to another State a party dying in 1884 of *smallpox*.
2. JAMES COLVILLE, 5 years, *diphtheria*, 1888, to be removed by railway from Johnson City cemetery to Lakeside cemetery, Erie, New York.
3. SUSAN MOORE, 7 years, *diphtheria*, 1860, by private conveyance from a farm in Inland township, Cedar county, to the Inland cemetery, Inland township, Cedar county.
4. ANDREW GEORGE MOORE, 1 year, *scarlet fever*, 1860, to be removed and reinterred as above.
5. IRA M. DUTTON, 6 years, *diphtheria*, 1883, by private conveyance from Trenton cemetery, town of Trenton, county of Henry, to Forest Home cemetery, in the city of Mt. Pleasant, county of Henry.
6. DON ARMSTRONG, 3 years, *croup*, 1863, by private conveyance from Leeds Grove cemetery, township of Elk River, county of Clinton, to Oakland cemetery, township of Spring Valley, county of Clinton.
7. FLORENCE DIANA RUTH JEFFRIES, 2 years, *membranous croup*, 1895, by private conveyance from Oakland cemetery, township of Spring Valley, county of Clinton, to another lot in the same cemetery.
8. DAVIS LOSH, 2 years, *membranous croup*, 1899, from Woodland cemetery, city of Des Moines, by private conveyance to another lot in the same cemetery.
9. KATIE HIGH, 8 years, *diphtheria*, 1879, St. Mary's cemetery, township of Julien, county of Dubuque, by private conveyance from one lot to another in the same cemetery.
10. MARGARET H. MCMANUS, 10 years, *scarlet fever*, from Riverside cemetery, in the city of Marshalltown, county of Marshall, by private conveyance to another lot in the same cemetery.

The foregoing applications were all approved, except the first one where death occurred from smallpox, and the Secretary was directed to issue special permits to the applicants.

[It is an inflexible rule of the Board that the disinterment and "transportation of bodies dead of smallpox, Asiatic cholera, typhus fever, yellow fever, or bubonic plague is absolutely forbidden.—EDITOR.]

FINANCIAL

The Secretary presented his financial report for the quarter ending July 31st, showing the total expenditures for the quarter

to be \$1,811.49; previously expended, \$2,310.72, making total expenditures since September 30, 1899, \$4,123.21. Balance of appropriation unexpended, \$877.78.

The following is the itemized report referred to:

SPECIAL EXPENSE ACCOUNT, MAY, 1900

J. A. McKlveen, attending Washington meeting.....\$ 85.85
Board meeting, August 5, 1900

MEMBERS' EXPENSE ACCOUNT

J. A. Scroggs.....	\$ 25.26
C. B. Adams	18.66
W. Bancroft.	25.66
J. A. McKlveen.....	18.57
H. Matthey.....	27.75
J. C. Shrader.....	24.76
R. E. Conniff	34.65
Warren Dickinson.....	15.60
J. I. Gibson.....	27.08
Total	\$ 217.99

Paid by State warrant No. 406

CURRENT EXPENSE ACCOUNT, MAY, 1900

J. F. Kennedy, Secretary	\$ 100.00
Margaret S. Schoonover, stenographer	65.00
F. R. Conaway, printing <i>Bulletins</i>	27.45
L. Young, binding <i>Bulletins</i>	9.00
Conference S. and P. boards of health	10.00
J. C. Shrader, investigating smallpox.....	14.58
R. E. Conniff, investigating smallpox.....	9.87
J. A. McKlveen, investigating smallpox	23.74
Omega Publishing company, (Sub. 1900)	1.00
Mutual Telephone company .....	.30
American Express company, (June).....	.30
American Express company, (April).....	.57
U. S. Express company.....	2.16
Total	\$ 263.97

Paid by State warrant No. 807

SPECIAL EXPENSE ACCOUNT, JUNE, 1900

R. E. Conniff, attending Atlantic City meeting.....	\$ 119.00
Paid by State warrant No. 1075.	
J. C. Shrader, attending Atlantic City meeting.....	110.88
Paid by State warrant No. 1074.	
J. A. Scroggs, attending Atlantic City meeting.....	104.30
Paid by State warrant No. 1093.	
J. C. Shrader, conference with Governor Shaw.....	9.76
Paid by State warrant No. 1110	
Board meeting, June 20th, 1900 (Special)	

MEMBERS' EXPENSE ACCOUNT

W. Bancroft	\$ 23.56
H. Matthey	22.50
J. A. McKlveen	14.49
C. B. Adams	16.46
J. C. Shrader	21.76
J. A. Scroggs	22.56
J. I. Gibson	24.08
Warren Dickinson	12.50
Total	\$ 157.91

Paid by State warrant No. 1109

CURRENT EXPENSE ACCOUNT, JUNE, 1900

J. F. Kennedy, Secretary	\$ 100.00
Margaret S. Schoonover, Stenographer.....	65.00
F. R. Conaway, printing <i>Bulletins</i> , etc.....	169.45
L. Young, binding <i>Bulletin</i>	9.00
Iowa Lithographing company, letter heads	34.75
Des Moines Box Works, tubes.....	8.38
I. W. Lozier, flowers for Dr. Guilbert.....	3.50
J. A. McKlveen, investigating smallpox, Lorimer.....	7.07
J. A. McKlveen, investigating smallpox, Afton.....	6.04
J. A. McKlveen, investigating smallpox, Murray	5.60
J. A. McKlveen, investigating smallpox, Lovilia.....	5.09
R. E. Conniff, investigating smallpox, Lemars.....	3.75
Thomas E. Cox, newspapers .....	.30
Adams Express company .....	.25
American Express company.....	.25
Westen Union Telegraph company.....	.87
Total	\$ 419.30

Paid by State warrant 1391

CURRENT EXPENSE ACCOUNT, JULY 1900

J. F. Kennedy, Secretary	\$ 100.00
Margaret S. Schoonover, stenographer.....	65.00
F. R. Conaway, printing	57.45
L. Young, binding.....	12.00
L. Schooler, postage stamps.....	20.00
J. F. Kennedy, notarial commission.....	11.00
Iowa State Register, printing	45.40
Interior Decorative company, brush .....	.20
Baker-Trissler Co., blotters and mucilage.....	2.50
Adams Express company.....	2.25
American Express company	2.95
U. S. Express company.....	2.65
Wells Fargo & Co., Express .....	.38
Western Union Telegraph company.....	.75
Total	\$ 322.53

Paid by State warrant 2045

RECAPITULATION

Special expenses, May.....	\$ 85.85
Members expenses, May.....	217.99
Current expenses, May.....	263.97
<hr/>	
Total, May..	\$ 567.81
Special expenses, June.....	\$ 343.95
Members expenses (special meeting).....	157.91
Current expenses, June.....	419.30
<hr/>	
Total.....	\$ 921.16
Current expenses, July	\$ 322.50
<hr/>	
Total for Quarter.....	\$ 1,811.50
Previously expended.....	2,310.72
<hr/>	
Total expenditures.....	\$ 4,122.22

REPORT OF AUDITING COMMITTEE.

The report was referred to the auditing committee, who reported as follows:

"Your auditing committee hereby certify that we have carefully audited the report of the Secretary as above given and find the same to be correct, and that proper vouchers are on file verifying each item of expenditure.

WARREN DICKINSON,
H. MATTHEY,
Committee.

The report of the committee was received, adopted and placed on file.

SMALLPOX

Dr. Shrader, on behalf of the committee on smallpox, reported progress and was given until the November meeting to complete his circular and report.

ANATOMICAL MATERIAL

There being quite a good deal of correspondence and evident misunderstanding in relation to the duties of coroners and undertakers, and their fees, and by whom such fees were to be paid, the Secretary was directed to prepare and, upon the approval of the President, publish another circular, covering the points in question, and to furnish them to the parties interested.

AMERICAN PUBLIC HEALTH ASSOCIATION

Dr. J. A. Scroggs, the Secretary and Dr. Charles B. Adams were elected delegates to the next meeting of the American Pub-

llc Health Association, which will be held at Indianapolis, Ind., October 22d, 23d, 24th, 25th and 26th.

On motion the Board adjourned to meet the first Wednesday of November unless sooner convened by the President.

THIRD QUARTERLY MEETING—NOVEMBER, 1900.

The State Board of Health met in regular session as per adjournment, at the office of the State Board of Health, Des Moines, November 7, 1900, and was called to order by President Dr. J. C. Shrader, at 10 A. M. There were present Shrader, Matthey, Bancroft, Scroggs, Conniff, McKlveen, Gibson, and Adams. The minutes of the last meeting were read and approved. The report of the Secretary for the quarter ending October 31st, was read, received and referred to the various standing committees.

INFECTIOUS DISEASES.

The report of the Secretary relating to infectious diseases was as follows: *Smallpox* has been reported during the quarter as having occurred at the following localities:

August.—Montpelier township, Muscatine county; Grand Mound; and Dodge township, Boone county.

September.—Odebolt, Grand Mound, Webster City, Lost Creek, and Nemaha.

October.—Center and Jordan townships, Monona county; Des Moines; Moorhead; Webster City; Webster township, Hamilton county.

I was called to Titonka, in Kossuth county, about the middle of October, to investigate a supposed case of smallpox, but was gratified to be able to report that no such disease existed.

Typhoid Fever.—There have been a larger number of case of typhoid fever throughout the state than usual, judging from items appearing in the newspapers. Outbreaks of this disease are not reported to this office as it is not a quarantinable disease unless they assume something like epidemic proportions. The two most notable outbreaks in the state have occurred in connection with state institutions, the one in the hospital for the insane at Independence and the other at the Iowa State College at Ames. Exact data in regard to the former outbreak have not been received, but there have been in the neighborhood of two hundred cases, with nearly, if not quite, a score of deaths. Dr. Hill, the superintendent, informs me that the cause was traced to contamination of the water in one of the tanks supplying the institution.

At the request of Mr. Hungerford, President of the Board of Trustees of the Iowa State college, I visited the institution in person on the 26th of October, and from all the data I was able

to obtain and from careful personal investigation I was lead to concur in the opinion arrived at by the college authorities that the cause of the disease was contaminated milk. So far as the results of these cases of typhoid have been observed the disease has been mild in type, the mortality being below the average.

Diphtheria and Scarlet Fever have been reported from a number of localities and it is gratifying to note in almost every instance the promptness and efficiency with which quarantine regulations are carried out by local boards. So far in no instance has either disease assumed epidemic proportions in any locality.

The report of the Committee on Infectious Diseases was as follows:

Your committee on contagious diseases reports as follows:

We have noted with interest the report of infectious diseases, by the Secretary, especially in regard to outbreaks of typhoid fever at Hospital for Insane at Independence, and the Iowa State College, Ames. We recommend that a committee be appointed to prepare and report, at next meeting, a circular on typhoid fever for the better information of the people on this subject.

H. MATTHEY,

C. B. ADAMS.

The report was adopted, and the President and Secretary were appointed a committee to prepare a circular on the Prevention and Restriction of Typhoid Fever, for consideration and adoption by the board at its regular meeting in February, 1901.

CIRCULARS

The Secretary reported that, as instructed by the board at its meeting in August, he had had printed 10,000 copies of a circular on tuberculosis and 4,000 copies of one on smallpox, for free distribution.

On motion the board declared both circulars as official and entitled to respect and observance, as declared by statute.

GASOLINE LAMPS

The board, upon the receipt of the report of the committee on the use of gasoline as an illuminant, passed favorably upon the following lamps:

"The Simplicity, style B," "The Efficient, No. 6," "Pressure Arc Lamp, No. 5 E."

The following lamps had been previously approved:

"New Century Lamp, No. 50," "The Rockford X Ray," "The Omaha Automatic Gas Lamp," "The Standard Gas Lamp," "The Columbian," and the "Imperial Lamp." "The Welsbach Hydrocarbon Incandescent," all styles; "The M. & M. Arc," two styles, one for store and one for street, and the "No. 5 Special."

It is to be understood that the Board does not issue guarantees of safety for any of these lamps, and does not especially commend any one as more than reasonably safe under proper care.

No lamp not having this approval by the Board, after due test and consideration, can be used in Iowa without violating the law and subjecting those using them to severe penalties.

FINANCIAL

The Secretary submitted a report showing the expenditures of the Board for the quarter ending October 31, 1900, which is as follows:

The following financial exhibit shows the expenditures of the Board for the quarter ending October 31st. Under the statute the fiscal year ended September 30th, and hence the expense account for the month of October, though a part of this quarter, is really a part of the new fiscal year. The expenses for the entire fiscal year, ending September 30th were exactly \$5,000.00—the full amount of the appropriation.

The items of expenditures were as follows:

Board meeting August 3, 1900.

MEMBERS' EXPENSE ACCOUNT

R. E. Conniff	\$ 34.50
W. Bancroft.....	27.06
J. A. Scroggs.....	27.56
Warren Dickinson...	16.00
H. Matthey.....	30.00
J. I. Gibson	26.58
C. B. Adams.....	19.96
J. C. Shrader.....	19.76
J. A. McKlveen.	19.82
Total.....	\$ 221.24

Paid by State warrant No. 2069

CURRENT EXPENSES FOR AUGUST, 1900

J. F. Kennedy, Secretary.....	\$ 100.00
Margaret S. Schoonover, stenographer	65.00
F. R. Conway—	
6,300 <i>Bulletins</i>	\$ 28.00
10,000 circulars, form 5	35.00
2,000 Rules and Regulations	20.00
	83.00
L. Young, binding <i>Bulletins</i>	9.00
Carter & Hussey, <i>Bulletin</i> wrappers.....	11.50
<i>Journal, American Medical Association</i>	5.00

Adams Express company	1.20	
United States Express company .....	.80	
Wells Fargo & Co., express... ..	.25	
Western Union Telegraph company	2.59	
	<hr/>	
Total		\$ 278.34
Paid by State warrant No. 2671		

CURRENT EXPENSES FOR SEPTEMBER, 1900

J. F. Kennedy, Secretary.....	\$ 100.00	
Margaret S. Schoonover, Stenographer.....	65.00	
Lewis Schooler—		
Stamps and envelopes	\$135.06	
<i>Bulletin</i> , postage account	25.00	
	<hr/>	160.06
F. R. Conaway, printing 6,300 <i>Bulletins</i>	28.00	
L. Young, binding <i>Bulletins</i>	9.60	
Langan Bros.—		
100 paper fastners.....	.10	
100 " " .....	.12	
¼ lb. rubber bands .....	.69	
2 gross ¼ rubber bands.....	2.10	
1 " ½ " " .....	.90	
1 " " " " .....	.54	
1 " ½ " "	1.65	
	<hr/>	6.10
Karl Kennedy, mailing <i>Bulletin</i>	6.00	
<i>American Veterinary Review</i>	3.00	
Adams Express company.....	1.05	
	<hr/>	
Total.....		\$ 378.21
Paid by State warrant No 3214		

SPECIAL EXPENSE ACCOUNT, OCTOBER 8, 1900

J. F. Kennedy, attending Denver meeting.....	\$ 44.60
Paid by State warrant No. 3449	

CURRENT EXPENSES FOR OCTOBER

J. F. Kennedy, Secretary.....	\$ 100.00	
Margaret S. Schoonover, Stenographer.....	65.00	
F. R. Conaway—		
Printing 2,000 envelopes.....	\$ 2.00	
Printing 6,300 <i>Bulletins</i>	28.00	
Printihg 4,000 circulars, form 8.....	17.50	
	<hr/>	\$ 47.50
Carter & Hussey—		
Binding 31 copies <i>Bulletin</i>	\$ 12.40	
Printing title pages.....	3.00	
	<hr/>	15.40
L. Young—		
Binding <i>Bulletins</i>	\$ 9.00	

Folding and stitching Form No. 5.....	15.00	
		\$ 24.00
American Express Company, August .....		.40
American Express Company, September .....		.60
Adams Express Company .....		.18
U. S. Express Company, August and September.....		1.00
		<hr/>
Total.		\$ 254.08
Paid by state warrant No. 3920.		

The report of the Secretary, showing the expenditures of the Board for the quarter ending October 31st, having been referred to the auditing committee, was reported upon as follows:

The undersigned auditing committee respectfully report that we find the financial statement of the Secretary correct in every particular, and that proper vouchers have been filed corresponding with the items of expenditures.

(Signed.) WARREN DICKINSON,
H. MATTHEY.

The report was adopted.

DISINTERMENTS

The report of the Secretary showed that the nine special disinterment permits approved by the Board at the August meeting had been promptly issued, and that since that meeting there had been issued from the Secretary's office 180 ordinary disinterment permits.

Applications were filed for a number of special permits which were referred to the committee on corpses—Dr. Bancroft, chairman—who reported in favor of the following:

GRACE BELLE SLYE, *scarlet fever*, 1884, by private conveyance, from one lot to another in Woodland cemetery, Des Moines.

GEORGE HENRY SLYE, *diphtheria*, 1875, by private conveyance, as above.

LILLIE BENCH, *diphtheria*, 1887, by private conveyance, from the city cemetery, Davenport, to Fairmount, Rockingham township, Scott county.

MARY BLACK, *membranous croup*, 1891, by private conveyance, from Floyd cemetery, Sioux City, to Floyd cemetery annex, same city.

DELIA C. PIPER, disease unknown, 1896, by private conveyance, from Lincoln cemetery, Lincoln township, Sioux county, to Hope cemetery, in the same township.

EDDIE KNOTSMAN, *scarlet fever*, 1878, by private conveyance, from one lot in Oakdale cemetery, Davenport, to another lot in same cemetery.

ALICE MYRTLE HORNE, *diphtheria*, 1889, by private conveyance, from one lot to another in Oakdale cemetery, Davenport.

MATTIE ELNORA JOHNSON, *scarlet fever*, 1869, by private conveyance, from Pleasant Ridge cemetery, in Wyoming township, Jones county, to Wyoming cemetery, in the city of Wyoming.

WILLIE CALVIN HEATON, *Diphtheria*, 1898, by private conveyance, from one lot to another in the cemetery of the city of Clarinda.

In addition to the above, special permits were issued to disinter and remove several parties, in two or three localities, from abandoned cemeteries, where the names, date and cause of death were unknown. The conditions imposed by the Board upon those permitted to make these special disinterments are as follows:

1. That the disinterment is for the purpose of re-interment in another part of the same cemetery, or in a cemetery nearly contiguous.
2. That the removal shall not be by any public conveyance.
3. That the removal shall be done at an hour when there is the least possible exposure of other persons.
4. That no children shall be present, and only such persons as are actually necessary.
5. That the coffin shall not be opened.
6. That the sexton and all other persons engaged in such removal shall immediately thereafter change their clothing and properly disinfect or burn the same, and shall thoroughly disinfect their hands, head and face.
7. That this permit shall be approved by the local Board of Health of the town, city or township in which the body is interred.

EMBALMERS' EXAMINATIONS

The Secretary was directed to hold an examination in the office of the State Board of Health, in Des Moines, for applicants for embalmers' permits January 25, 1901. Parties desiring to avail themselves of this opportunity should apply to the Secretary for particulars.

SMALLPOX

The Secretary presented a communication regarding smallpox at Calamus, and charging great laxity of quarantine, and Dr. Conniff made a statement in regard to conditions at George and Morehead, alleging a dangerous disregard of the proper measures for the prevention and restriction of the spread of the disease.

On motion, President Shrader was requested to write the health authorities of these localities and insist upon a strict compliance with the law.

PERSONAL

Dr. Conniff presented the following resolution, which was unanimously adopted by a rising vote:

WHEREAS, The terms of service of two members of this board, Dr. J. A. Scroggs and Gen. Milton Remley, practically expire with this meeting, and,

WHEREAS, We recognise in them able, conscientious and efficient members whose work on this board has done much for the cause of preventive medicine; therefore be it

Resolved, That this board express its appreciation of this valuable service, its personal regard for them as men and citizens, and its deep regret that our association, which has been at all times most cordial and pleasant, is so soon to terminate, and to assure them that their counsel and help in the work of the board will be greatly missed. .

On motion, the board adjourned to meet the first Wednesday in February, 1901, unless sooner convened by the President.

SPECIAL MEETING—DECEMBER, 1900

The Iowa State Board of Health convened in special session upon the call of President Shrader, and was called to order at 2 p. m., December 18, 1900, *ultimo*.

There were present Shrader, Bancroft, Adams, Conniff, McKlveen, Scroggs, Matthey, Gibson.

SMALLPOX

The Secretary read several communications from Stratford, Homer and Stanhope respecting a prevalence of smallpox and a failure to carry out the rules and regulations of the state and local boards relative to quarantine, vaccination, etc.

On motion Dr. C. B. Adams was instructed to visit the localities and adopt such measures as in his judgment will best protect the people against the further spread of the disease.

GASOLINE LAMPS

The following gasoline lamps were approved by the Board and their use permitted in Iowa: "The American Arc No. 2," "The Magic Arc," "The Magic Gravity," and the "Solar Arc."

The following lamps had been previously approved: "The Simplicity, style B," "The Efficient, No. 6," "Pressure Arc Lamp, No. 5 E," "New Century Lamp, No. 50," "The Rockford X Ray,"

"The Omaha Automatic Gas Lamp," "The Standard Gas Lamp," "The Columbian," "The Imperial Lamp," "The Welsbach Hydrocarbon Incandescent," all styles; "The M. and M. Arc," two styles, one for store and one for street, and the "No. 5 Special."

It is to be understood that the Board does not issue guarantees of safety for any of these lamps and does not especially commend any one as more than reasonably safe under proper care.

No gasoline lamp not having the approval by the Board, after due test and consideration, can be used in Iowa without violating the law and subjecting those using them to severe penalties.

SPECIAL DISINTERMENT PERMITS

The following special disinterment permits were granted:

GLEN BURNETT, 1889, *diphtheria*, by private conveyance from one lot to another in Woodland cemetery, Des Moines.

LEVI ELLIS, 1880, *diphtheria*, by team from Huff Settlement cemetery, Walnut township, Dallas county, to Grimes cemetery, Webster township, Polk county.

ARTHUR ERNEST KUHN, 1880, *diphtheria*, by private conveyance from Mt. Carroll cemetery, Chickasaw township, Chickasaw county, to Greenwood cemetery, Bradford township, same county.

NELLIE MAHONEY, 1900, *diphtheria*, by railroad from Catholic cemetery, Iowa City, to Victor, Iowa.

BESSIE INEZ NELSON, 1878, *membranous croup*, by team from Calhoun cemetery, Calhoun township, Harrison county, to Woodbine cemetery, Boyer township, same county.

FOURTH QUARTERLY MEETING—FEBRUARY, 1901

The regular quarterly meeting of the State Board of Health was convened February 6, 1901, and called to order by President J. C. Schrader at 10:30 A. M.

There were present Shrader, McKlveen, Adams, Bancroft, Gibson, Powers.

A communication was read from the Executive Office announcing the appointment of Dr. Fred W. Powers of Reinbeck as a member of the State Board of Health in place of Dr. Scroggs whose term of service had expired.

The Secretary also read a communication from Dr. H. Matthey announcing the death of his mother and his inability to be present.

The minutes of the November meeting and of the Special meeting held in December, were read and approved.

SECRETARY'S REPORT

The report of the Secretary for the quarter ending January 31st was read and referred to the appropriate Standing Committee.

The Secretary called especial attention to the large number of reports of outbreaks of infectious diseases; to correspondence on hand; to applications for special disinterment permits; to the expenditures of the Board, etc.

INFECTIOUS DISEASES

In regard to infectious diseases the Secretary reported as follows:

There have been reports to this office of infectious diseases from a greater number of points in the State than for any other like period in the history of the Board so far as I have any recollection. The reports of outbreaks of smallpox are especially numerous. The points of incidence for November and December have been published in the December and January BULLETIN and those for January are given herewith. Quite a number of calls have been made at this office for personal investigations, with a view of settling questions of diagnosis, some of which were responded to by your Secretary and others referred to the members of the Board who were contiguous to the localities desiring such visits. It was the observation of your Secretary that where such visits are made it has always been in the interests of the public health, the authorities cheerfully and promptly complying with the decision and directions given.

It has been somewhat surprising to note the number of places throughout the State where quarantine has not been enforced because of a failure to recognize the true character of the disease. I have sent out a great amount of literature from the office, especially Circulars No. 1, 2, 3 and 7, and those upon tuberculosis and smallpox. Circular No. 3 became entirely exhausted and demands for it were so frequent that upon consultation with your President I had re-published an edition of 4,000 copies. The circular upon smallpox has been also in such demand that I have ordered a second edition of it. There seems to be no occasion for revision of these circulars and the President suggested that under no circumstances should we allow the edition to become completely exhausted.

I would be glad if the Board would officially authorize me under such circumstances to reprint exhausted editions of our official circulars where a revision is not required.

In addition to the reports of smallpox as published in the BULLETIN I herewith report the following outbreaks for the month of January:

Boone; Webster City; Rands; Eden and Arcadia township, Carroll

county; Guttenburg; Weston; Elkader; Des Moines; Audubon; Dubuque; Ladora; Harrison and Garfield townships, Mahaska county; Eddyville; Murray; Viaton; Victor; Davenport; Viola; Cook and Levey Townships, Sac county; Portland and Lincoln township, Plymouth county; Washington and Garner townships, Pottawattamie county; Franklin township, Manona county; Percy; Clay township, Shelby county; Belmond; Guthrie Center; Atlantic; Rock Rapids; Waterloo; Kamrar; Marne; Independence; Hamilton; Blairsburg and Fremont townships, Hamilton county; Jewell; Perry township, Marion county; County Farm, Webster county; Douglas; Leroy and Hamlin townships, Audubon county; Sheridan township, Scott county; Ottumwa; Mason City; Fremont and Cedar townships, Johnson county; Shenandoah; Bymosa; Brighton; Bear Grove and Grant townships, Cass county; Elberon; Dodge township, Boone county; Maxwell; Livermore; Creston; Blair township, Ida county; Washington township, Sioux county; Washington township, Winneshiek county; Cromwell; Lewis; Armstrong; River Junction; Anita; Blencoe; Paton; Libson; Gowrie; Humboldt; Delano; Avery and Weaver townships, Humboldt county; Villisca; LaPorte; Avoca; Union township, Adams county; Dana; Humboldt, Rock township, Lyon county; Stockholm township, Crawford county; Eldridge; Indianola; Jefferson township, Dubuque county; Garfield township, Montgomery county; Harrison and Summerset townships, Adair county; Oelwein; Wall Lake; Springfield township, Kossuth county.

In order to give you an idea as to the area of territory covered by this disease I have to say that it has appeared in the following counties :

Adair; Adams; Audubon; Benton; Black Hawk; Boone; Buena Vista; Butler; Calhoun; Carroll; Cass; Cerro Gordo; Cherokee; Clarke; Clayton; Clinton; Crawford; Des Moines; Dubuque; Emmet; Fayette; Greene; Guthrie; Hamilton; Harrison; Humboldt; Ida; Iowa; Johnson; Jones; Kossuth; Linn; Lyon; Mahaska; Monona; Marion; Monroe; Montgomery; O'Brien; Osceola; Page; Plymouth; Palo Alto; Polk; Pottawattamie; Poweshiek; Sac; Scott; Shelby; Sioux; Story; Tama; Union; Wapello; Warren; Webster; Winneshiek; Woodbury; Wright.

Supplementary to what I have said above relative to smallpox I have to report that in addition to other infectious diseases reported in the BULLETIN for November and December I have received the following reports for January :

Diphtheria. Jamaica; Dixon; Eden township, Benton county; Sioux Rapids; Union township, Benton county; Springbrook; Boone; Rockford; Kirkville; Nora Springs; Lynnville; Rock Grove township, Floyd county; Hays township, Crawford county; Jackson Junction; Vail; Adaza; Algona; Stanton; Waverly; Richland township, Guthrie county; Rock Falls; Fostoria; Waucoma.

Measles. Fontanelle; Ocheydan.

Scarlet Fever. Cylinder; Parnell; Exira; Adair; Ida Grove; Roselle; Bonaparte township, Van Buren county; Bonaparte; Rodman; Reels; Silver Creek township, Ida county; Persia; Bridgewater; Corwin township, Ida

county; Ackley; Doon; Rapids township, Linn county; Franklin township, Allamakee county; Sumner township, Bremer county; Kilduff; Bennezzette township, Butler county; Fairfield; Fayette; Central City; Fontanelle; Fremont township, Fayette county; Cass township, Harrison county; Woodbine; Altoona; Sutherland; Lincoln township, Warren county; Waucoma; Center township, Fayette county; Jamaica; Blanchard; Beaman; Morning Sun; Westgate; What Cheer.

Typhoid Fever. Linn Grove; Floyd; Waucoma; Burlington.

It is the custom of this office whenever we receive reports of infectious diseases to send out to the party so reporting a set of our circulars, distributing especially liberally our circular on smallpox and tuberculosis. The people of the State have never been so well supplied with the literature of our Board. The State Superintendent of Public Instruction was furnished from this office several hundred copies of our circulars No. 2 and 3 which he distributed from his office to superintendents and principals throughout the State.

Dr. Conniff reported a visit to Weston to investigate small pox and Dr. Powers reported a visit to LaPorte City for the same purpose, and the small pox condition throughout the State was discussed quite freely.

On motion Board adjourned to call of President.

THURSDAY, FEBRUARY 7th, 10:30 A. M.

Board reconvened by call of the President at 10:30 a. m. There were present Shrader, McKlveen, Powers, Adams and Gibson.

COMMUNICATIONS

The report of the Committee on Communications, Dr. McKlveen, chairman, was read and adopted.

DISINTERMENTS

Dr. Bancroft, Chairman of the Committee on Corpses, reported in favor of four applications for special disinterment permits—the parties having died of infectious diseases. He also reported in favor of the transportation through Iowa to Mt. Pleasant of the remains of Dr. W. R. McAdam, interred at Key West, Florida—the cause of death being Yellow Fever; assurances being given by Dr. R. D. Murray, Surgeon H. M. S., that the remains “were enclosed in a hermetically sealed iron casket; the casket inclosed in a zinc-lined box and both were inclosed in a board box.”

The recommendations relative to the disinterments were adopted, and on motion, Rule 1 of the rules for the transportation of corpses was suspended, and the Secretary was instructed to issue the permit for the transportation of the remains of Dr. W. R. McAdam into and through Iowa to Mt. Pleasant.

GASOLINE

A communication was read asking that the branding of gasoline be so modified as to conform to the requirements of Chapter 83, Laws Twenty-eighth General Assembly. The brand as now used reads "rejected for illuminating purposes." Chapter 83, above referred to, permits its use in gasoline lamps approved by the State Board of Health. The Board directed that hereafter gasoline should be branded and cans containing it should be labelled "Gasoline—Rejected for illuminating purposes except in gasoline lamps approved by law."

GASOLINE LAMPS

Two of the members of the committee on gasoline lamps being absent and the remaining member not being able to report definitely, there were no additional lamps approved. It was stated that no such lamps can receive consideration at the hands of the Board or its committee, unless the manufacturer or some agent appears before the Board when in session with a sample of the lamp, to be tested, complete in all its parts. The simple burner of the lamp, or pictorial illustrations of it, will not receive consideration. It must be trimmed and burning, so that its faults as well as its virtues from the standpoint of *safety* may be determined.

PHYSICIANS TO BE NOTIFIED

The following action was taken by the Board relative to physicians who were reported as obstructing efforts to quarantine cases reported as smallpox by calling the disease chickenpox. People who have smallpox or who have been quarantined because of exposure to it, are glad to find anyone to dispute the diagnosis, and the declaration of such a physician even though he may never have seen a case of smallpox or one of the cases reported as having it will have more weight than that of a dozen physicians, who have seen and treated many cases of smallpox and chickenpox and who had personally seen and carefully examined the cases in question.

"WHEREAS, It has come to the knowledge of the Board that Drs. ———, ———; and ———; respectively of ———; ——— and ———; have visited cases of smallpox, as diagnosed by a member of this Board and by other reputable physicians, naming it chickenpox, thus indirectly interfering with the legally established quarantine and thereby causing dissatisfaction in their localities; therefore be it

RESOLVED, That it is the sense of this Board that such practice is detrimental to the best interests of the people, and is condemned by this Board

RESOLVED, That if this practice continues, such physicians will be cited to appear before the State Board of Medical Examiners, to show cause why their certificates should not be revoked for incompetency, or willful violations of the rules of this Board, to the great detriment of good order, and greatly endangering the health and lives of the people.

FINANCIAL

The Secretary presented the following report which was recieved and referred to the Auditing Committee:

The following statement represents the expenditures of the board for the quarter ending January 31, 1901:

Board meeting November 9, 1900

MEMBERS EXPENSE ACCOUNT

J. A. McKlveen.....	\$ 19.80
W. Bancroft.....	27.56
H. Matthey	28.75
J. A. Scroggs.....	28.06
J. I. Gibson	26.58
R. E. Conni ff.....	33.60
Warren Dickinson	16.00
C. B. Adams.....	24.86
J. C. Shrader	26.26
Total	\$ 231.47
Paid by state warrant No. 4080	

SPECIAL EXPENSE ACCOUNT

C. B. Adams, Indianapolis meeting.....	\$ 65.66
Paid by state warrant No. 4108	

CURRENT EXPENSES FOR NOVEMBER, 1900

J. F. Kennedy, secretary	\$ 100.00
Margaret S. Schoonover, stenographer.....	65.00
F. R. Conaway, printing <i>Bulletins</i>	28.00
L. Young, binding circulars and <i>Bulletins</i>	15.90
R. E. Conniff, investigating smallpox.....	18.56
Borden & Selleck, letter scale	1.00
Babyhood Publishing company	1.00
Gottfried Ball, grinding knife.....	.50
Adams Express company.....	.60
American Express company .....	.30
U. S. Express company.....	.85
Total.....	\$ 231.71
Paid by State warrant No. 4603	

Special meeting December 19th, 1900

MEMBERS' EXPENSE ACCOUNT

J. A. Scroggs.....	\$ 25.56
J. C. Shrader.....	17.78
R. E. Conniff.....	33.50
C. B. Adams.....	21.46
H. Matthey.....	25.75
W. Bancroft.....	25.06
J. I. Gibson.....	23.58
J. A. McKlveen.....	17.80
Total.....	\$ 190.49

Paid by State warrant No. 4895

CURRENT EXPENSES, DECEMBER, 1900

J. F. Kennedy, secretary.....	\$ 100.00
Margaret S. Schoonover, stenographer.....	65.00
F. R. Conaway, printing <i>Bulletin</i>	28.00
L. Young, binding <i>Bulletin</i>	9.45
C. B. Adams, investigating smallpox.....	14.04
C. B. Adams, investigating smallpox.....	5.20
American Public Health Association.....	5.00
Munn & Co., supplement.....	5.00
Geo. S. Lasher, U. S. postal guide.....	2.00
Municipal Engineering company.....	2.00
<i>Popular Scientific News</i>	1.60
U. S. Express company.....	1.00
Total.....	\$ 238.29

Paid by State warrant No. 5248

CURRENT EXPENSES JANUARY, 1901

J. F. Kennedy, secretary.....	\$ 100.00
Margaret S. Schoonover, Stenographer.....	65.00
Myers & Tucker, Printing and mailing <i>Bulletin</i>	56.30
State Printing House, printing and engraving.....	25.00
J. C. Shrader, investigating smallpox.....	24.93
Conference State and Provincial Boards of Health.....	5.00
Journal Composition Medical and Veterans Arch.....	3.00
American Express company.....	.45
Total.....	\$ 279.68

Paid by State warrant No. 6006.

RECAPITULATION.

November board meeting.....	\$ 231.47
November special meeting.....	65.66
November current expenses.....	231.71
December board meeting.....	190.49

December current expenses.....	238.29
January, 1901 current expenses	279.68
Total	\$ 1,237.30

REPORT OF AUDITING COMMITTEE.

The undersigned auditing committee respectfully report that we have examined the foregoing financial statement of the Secretary and find the same correct and that vouchers filed therewith correspond with the items of expenditures.

Respectfully submitted.

(Signed) J. I. GIBSON.

The report of the Committee was received and adapted.

On motion the Board adjourned to meet the first Wednesday of May unless ordered otherwise by the President.

ANNUAL MEETING—MAY, 1901.

The Iowa State Board of Health convened at its office, Capitol building, and was called to order by President Shrader at 10 A. M., Monday, May 20, 1901.

There were present, Shrader, Adams, Gibson, Powers, Conniff, Matthey, McKlveen, and Dr. A. M. Linn, of Des Moines, appointed to fill the vacancy occasioned by the resignation of Dr. Bancroft.

The minutes of the last meeting were read and approved.

The report of the Secretary for the quarter ending April 30th, was read, approved, and referred to appropriate standing committees.

On motion Board adjourned to meet upon the call of the President.

Reconvened at 2 P. M., and was called to order by President Shrader.

There were present, Shrader, Conniff, Powers, Adams, Gibson, McKlveen, Matthey, and Linn.

Dr. Matthey took occasion to express very feelingly his appreciation of the resolutions passed by the Board at its last meeting relative to the death of his mother.

Adjourned upon call of the President.

Board re-convened at 11:30 A. M., Tuesday, 21st, with Dr Shrader in the chair.

There were present, Shrader, McKlveen, Linn, Adams, Conniff, Matthey, and Powers.

SPECIAL DISINTERMENTS

The following special disinterment permits were issued:

HULDA ARZBERGER, *diphtheria*, 1889, by private conveyance from city cemetery Davenport to Fairmount cemetery, Rockingham township, Scott county.

OTTO ARZBERGER, *membranous croup*, 1888, to be disinterred and reinterred as above.

GERTRUDE ASHBAUGH, *scarlet fever*, 1895, by private conveyance from Pleasant Grove cemetery, Sigourney township, Keokuk county, from one lot to another in the same cemetery.

BLANCHE PHILIPS BEWGER, *diphtheria*, 1893, by private conveyance from one lot to another in Newton cemetery, town of Newton, Iowa.

MILLARD GRACEY, *scarlet fever*, 1893, by private conveyance from one lot to another in Woodland cemetery, Des Moines.

CLARA LUCRETIA GATROST, *scarlet fever*, 1901, by private conveyance from one lot to another, in Valley View cemetery, Union township, Harrison county.

MARY IDA GEWEYS, *scarlet fever*, 1882, by private conveyance from Blue Grass cemetery, Blue Grass, to Chippinock cemetery in Rock Island, Illinois.

CLARA ANNA BERTHA HEMANN, *diphtheria*, 1848, from Oakland cemetery, Cooper township, Webster county, to Haviland cemetery, Cooper township, same county.

FRANK MULSOFF, *diphtheria*, 1830, by private conveyance from private yard near Nashua, in Bradford township, Chickasaw county, to Pearl Rock cemetery in same township.

ROY POINTER, *membranous croup*, 1889, by private conveyance from one lot to another in Woodland cemetery, Des Moines.

GERTIE SCHERMERHORN, *diphtheria*, by private conveyance from Fleming cemetery, Fremont township, Buchanan county, to Fairview cemetery, Winthrop.

ADOLPH STECKEL, *scarlet fever*, 1890, by private conveyance from Fairmount cemetery, Rockingham township, Scott county, to another lot in the same cemetery.

NELLIE MATILDA STONEMAN, *diphtheria*, 1896, from Young cemetery, Ohio township, Madison county, to another lot in the same cemetery.

MABEL L. TABOR, *diphtheria*, 1890, by private conveyance from one lot to another in Floyd cemetery, Sioux City.

LEROY WHORTON, *diphtheria*, 1900, by private conveyance from Montrose cemetery in the city of Montrose, to Nauvoo cemetery in the city of Nauvoo, Illinois.

Adjourned to call of the President.

Reconvened at 3 P. M., President Shrader in the chair.

Present, Shrader, Powers, Matthey, Conniff, Linn, Adams and McKlveen.

OFFICERS

Dr. J. C. Shrader was re-elected president; Dr. J. F. Kennedy,

secretary; Margaret S. Schoonover, stenographer; Dr. Eli Grimes, bacteriologist, and Prof. S. R. Macy, chemist.

Dr. Shrader was elected delegate to the British Congress on Tuberculosis in London, England.

GASOLINE

On motion of Dr. Gibson, it was declared that any system of lighting for domestic use, where the gasoline is forced by gravity or otherwise from reservoirs or tanks outside the building, to be lighted and distributed by pipes therefrom to lamps inside the building, comes within the purview of the State Board of Health, and must before being used receive the approval of said Board. This ruling is in accord with the recent opinions of Attorneys-General Remley and Mullan.

The following additional lamps were approved by the Board: "Nulite," "Bystrom Gas Lamp," "Corona," "Columbia," "Morey's No Mantle," "Grinnell Lamp," "Sterling Arc," "Sterling Gravity," "White Star," and "One Gallon Doran."

The following lamps had been previously approved by the Board:

"The American Arc No. 2," "The Magic Arc," "The Magic Gravity," the "Solar Arc."

"The Simplicity style B," "The Efficient No. 6," Pressure Arc Lamp No. 5 E," "New Century Lamp No. 50," "The Rockford X-Ray," "Omaha Automatic Gas Lamp," "Standard Gas Lamp," "The Columbian," "The Imperial Lamp," "the M. & M. Arc," two styles, one for store and one for street, and the "No. 5 Special."

It is to be understood that the Board does not issue guarantees of safety for any of these lamps and does not specially commend any one as more than reasonably safe under proper care.

No gasoline lamp not having the approval of the Board, after due test and consideration, can be used in Iowa without violating the law and subjecting those using them to severe penalties.

PERSONAL

The following tribute to Dr. W. Bancroft was presented by a committee appointed by the president:

MR. PRESIDENT AND MEMBERS OF THE STATE BOARD OF HEALTH—

Gentlemen,—Since our last meeting a respected and honored member has tendered his resignation to the Governor of the State.

Dr. Walton Bancroft has been compelled to take this step by long continued ill health.

We, his colleagues, deplore the necessity for this action on his part.

While a member of this Board he endeared himself to his colleagues by the most sacred ties. He is beloved and respected by us all. A noble Christian. His soul was in his work—that of alleviating human suffering and the prevention of disease. No nobler sentiment can engage the human mind.

Our love and best wishes will always follow him while here on earth.

(Signed) J. A. McKLVEEN,
J. C. SHRADER,
C. B. ADAMS.

FINANCIAL

The Secretary presented the following financial statement for the quarter ending April 30th, which was received and referred to the Auditing Committee:

Board Meeting, February 6 and 7, 1901

MEMBERS' EXPENSE ACCOUNT

R. E. Conniff.....	\$ 15.46
J. I. Gibson.....	26.83
W. Bancroft.....	23.31
J. C. Shrader.....	20.78
J. A. McKlveen.....	16.80
C. B. Adams.....	19.96
F. W. Powers.....	21.70
Total.....	\$ 144.84

Paid by State warrant No. 6103.

CURRENT EXPENSES FOR FEBRUARY, 1901.

J. F. Kennedy, Secretary.....	\$ 100.00
Margaret S. Schoonover, Stenographer.....	65.00
F. R. Conaway, 6000 circulars, No. 8.....	\$ 27.50
4000 circulars, No. 3.....	23.00
4000 circulars, No. 2.....	40.00— 90.50
Meyers & Tucker, printing 6300 <i>Bulletins</i>	56.30
Postage, January and February	6.15— 62.45
J. C. Shrader, investigating smallpox, Yale	14.71
R. E. Conniff, investigating smallpox, Weston.....	17.54
J. A. McKlveen, investigation smallpox, Lost Creek...	4.60
J. A. McKlveen, investigating smallpox, Cromwell....	11.92
J. A. McKlveen, investigating smallpox, Villisca.....	5.76
J. A. McKlveen, investigating smallpox, Indianola ...	4.50
F. W. Powers, investigating smallpox, La Porte City ..	7.00
C. B. Adams, investigating smallpox, Peterson and Kiron	19.80
C. B. Adams, investigating smallpox, Wall Lake and Rands	8.28
Iowa Printing company, record.....	11.00
Adams Express company.....	6.90
American Express company	3.36

United States Express company.....	3.28	
Wells, Fargo & Company, express	5.67	
Baker-Trissler company, one gross pens.....	.95	
	<hr/>	
Total		\$ 443.22
Paid by state warrant No. 6697.		

CURRENT EXPENSES FOR MARCH, 1901.

J. F. Kennedy, secretary.....	\$ 100.00	
Margaret S. Schoonover, stenographer.....	65.00	
Meyers & Tucker:		
Printing 6,300 <i>Bulletins</i>	\$50.00	
Mailing 6,300 <i>Bulletins</i>	6.30	
Express .....	.65	
Extra stamps, foreign.....	.31—	60.00
State printing house:		
4,000 rules and regulations No. 7.....	\$40.00	
1,500 envelopes, printing ..	1.50—	41.50
Iowa Lithographing company, 400 letter heads.....		5.00
<i>Popular Science Monthly</i>		3.00
<i>Domestic Engineering</i>		2.00
Puck Manufacturing company, 400 bill heads		1.50
Adams Express company.....		1.35
American Express company		1.00
United States Express company.....		1.25
Wells Fargo & Co. Express company .....		.61
The Sanitarian.....		4.00
	<hr/>	
Total		\$ 286.21
Paid by state warrant No. 7208		

CURRENT EXPENSES FOR APRIL, 1901.

J. F. Kennedy, Secretary	\$ 100.00	
Margaret S. Schoonover, stenographer	65.00	
Meyers & Tucker, printing 6,300 <i>Bulletins</i>	\$ 50.00	
" mailing " " 	6.30	56.30
J. C. Shrader, investigating smallpox.....		43.79
F. W. Powers, " " 		16.43
C. B. Adams, " " 		19.70
Puck Manufacturing company, 2,500 portfolios		2.50
United States Express company .....		.50
Well, Fargo & Co. Express company.....		.30
	<hr/>	
Total		\$ 304.52
Paid by state warrant No. 7813.		

RECAPITULATION.

The following represents the expenditures for the fiscal year thus far, beginning with October 1st:

October.....\$ 298.68

November.....	528.94
December.....	428.78
January.....	279.68
February.....	588.06
March.....	286.21
April.....	304.52
<hr/>	
Total.....	\$ 2,714.77
Annual appropriation	\$5,000.00
Expended.....	2,714.77
<hr/>	
Amount unexpended.....	\$ 2,285.23

The Auditing Committee reported that they had carefully audited the financial statement of the Secretary and that the same was found to be correct in every particular—that proper vouchers were shown corresponding with each reported item of expenditure.

The report of the committee was received and adopted.
(Inasmuch as footings in the foregoing financial exhibits for the various meetings have not been carried forward the Secretary desires to state that the entire amount of appropriation for each year ending September 30th was expended.)

STANDING COMMITTEES

<i>Auditing</i> —Matthey.	<i>Gasoline Lamps</i> —Gibson, Grimes, Macy.
<i>Communications</i> —Powers, Linn.	<i>Legislation and Legal Enforcement</i> —Mullan.
<i>Contagious Diseases</i> —Matthey, Adams.	<i>Library and Printing</i> —Adams, McKlveen.
<i>Corpses</i> —Conniff, Linn.	<i>Oil Inspection</i> —Adams, Gibson.
<i>Diseases of Animals and Veterinary Sanitation</i> —Gibson, McKlveen.	<i>Plumbing and Ventilation</i> —
<i>Disinfection</i> —Grimes.	<i>Publication and Rules</i> —Conniff, Linn.
<i>Food and Water</i> —Conniff, McKlveen, Adams.	<i>Schools</i> —McKlveen, Powers, Adams.
	<i>Sanitary Analysis</i> —Macy.

ADJOURNED

On motion the Board adjourned to meet the first Wednesday in August unless otherwise ordered by the President.

II

STATE BOARD MEDICAL EXAMINERS

Though chapter 17, title 12 of the Code, relating to the State Board of Medical Examiners, contains no provision for a report of any kind it seems that the State Board of Health having under the statute a general supervision of the lives and health of the people should at least in its biennial report give some data relative to the medical department of the state. In none of the reports heretofore issued, however, has there been any allusion to the work of this Board.

The law creating the State Board of Medical Examiners was enacted in 1886, and went into force July 1st of that year. It provided that the physicians of the State Board of Health, together with the Secretary, should be a Board of Medical Examiners, and that the Board should elect a President and Secretary. It authorized the Board to grant three forms of certificates; "A" to those who were graduates of medical colleges recognized by the Board as of good standing; "B," to those who had, at the time of the passage of the act, been not less than five years in continuous practice in the state, three years of such practice having been in one locality; and "C," to those who, not having these qualifications, passed a satisfactory examination before the Board. The fee for the first two certificates was placed at \$2, and for the "C" certificate \$10 was required, which enabled the applicant to have a re-examination in case of failure without additional fee.

Later the law was changed so that the Secretary ceased to be a member of this Board, but, by virtue of his connection with the Board of Health, as Secretary, he became Secretary of the Board of Medical Examiners, as well.

Under the law of 1886, the members of the Board were entitled to a per diem of \$10, and traveling and other necessary expenses, while performing their duties as such, and the Secretary was entitled to the sum of not more than \$5 a day for each day that he was engaged in the work of the Board.

The present Code cut down the pay of the members to \$8 per diem, and left the Secretary without any compensation. It raised the fee to \$5 for each certificate and \$20 for examinations, and provided, further, that itinerants should pay directly into the State Treasury the sum of \$250 per annum for an itinerants' permit, which they were required to have in addition to the regular physicians certificate; and provided that all persons beginning the practice of medicine in Iowa, after January 1st, 1899, should pass a satisfactory examination before the Board, and that in order to be admitted to this examination, they should be graduates of colleges of medicine recognized by the Board as of good standing, and requiring not less than four courses of medical study of not less than twenty-six weeks each, in separate years, as a condition of recognition by the Board.

The Twenty-seventh General Assembly passed an act, chapter 69, providing for the issuance of certificates to practice osteopathy. The Twenty-eighth General Assembly cut down the fee for examinations to \$10 and provided that graduates of Iowa Medical Colleges should be examined at the time and place of graduation. It also provided a salary for the Secretary not to exceed \$25 per month.

Since the organization of the Board certificates have been issued to 6,930 applicants, classified as follows: To regulars, 5,434; to Homeopaths, 804; to Eclectics, 576; to Physio-Medics, 55; to midwives, 39; miscellaneous, 22; total, 6,930.

The midwives above referred to were those engaged in practice in the state at the time of the enactment of the law who were graduates of colleges of midwifery, and these certificates were issued early in the history of the Board. It was discovered later that the statute made no provision for the issuance of certificates to this class, the law giving all women who were at the time of its enactment the right to practice midwifery without a certificate whether graduates or not. Those termed "miscellaneous" were hydropaths, electropaths, magnetic healers, etc., and they received their certificates on length of practice.

During the biennial period ending June 30, 1901, there were issued 314 certificates as follows: Regulars, 272; Homeopaths, 39; Eclectic, 2; Physio-Medics, 1. Total, 314. To men, 300; to women, 14.

All these certificates were upon examination, the applicants being graduates of the following colleges: American Medical College, St. Louis; Baltimore University; Barnes' Medical Col-

lege, St. Louis; Bennett College of Eclectic Medicine and Surgery, Chicago; Central Medical College, Indianapolis; Chicago Homeopathic Medical College; Chicago Physio-Medical College; College Physicians and Surgeons, Chicago; College Physicians and Surgeons, Baltimore; College Physicians and Surgeons, St. Joseph, Missouri; College Physicians and Surgeons, Keokuk; Cornell University, Ithica, New York; Eclectic Medical Institute, Cincinnati; Ft. Wayne College of Medicine, Indiana; Georgetown University, District Columbia; Hahnemann Medical College and Hospital, Chicago; Hahnemann Medical College, Philadelphia; Harvard University, Boston, Massachusetts; Iowa College Physicians and Surgeons, Des Moines; Jefferson Medical College, Philadelphia; Jenner Medical College, Chicago; John A. Creighton Medical College, Omaha; Kansas Medical College, Topeka; Kansas City Medical College, Missouri; Kentucky University, Louisville; Keokuk Medical College, College of Physicians and Surgeons, Iowa; Louisville Medical College, Kentucky; Marion Sims Medical College, St. Louis; McGill University, Montreal, Canada; Miami Medical College, Cincinnati; Missouri Medical College, St. Louis; New York Homeopathic Medical College; Northwestern University Medical School, Chicago; Northwestern University Woman's Medical School, Chicago; Queen's University, Kingston, Ontario, Canada; Royal University of Norway, Christiania; Rush Medical College, Chicago; St. Louis Medical College; Sioux City College of Medicine; Syracuse University, New York; Trinity University, Toronto, Canada; University of Iowa, Iowa City; University of Iowa (Homeopathic), Iowa City; University of Michigan, Ann Arbor; University of Munich, Germany; University of Oregon, Portland; University of Pennsylvania, Philadelphia; University of Vermont, Burlington.

Under chapter 69, laws of the Twenty-seventh General Assembly, relative to the practice of osteopathy, there have as yet been no certificates issued. There have been in all forty-four applications from the following colleges of osteopathy: American School of Osteopathy, Kirksville, Missouri; Quincy Osteopathic Institute, Illinois; Dr. S. S. Still College and Infirmary of Osteopathy, Des Moines.

Certificates were refused on the grounds that the colleges from which the applicants graduated were declared not to be as of good standing as contemplated by the law, and by the minimum requirements of the Board.

The Dr. S. S. Still College of Osteopathy has applied to the district court for a writ of mandamus to compel the board to issue certificates to its graduates. This case is now pending.

The fees allowed by law for the legitimate expenses of the Board have not been adequate to meet the expenses. This deficit might be met in part, if not wholly, by requiring the itinerants' license fee, two hundred and fifty dollars annually, now paid directly into the State Treasury, to be paid to the Board for its use; or by having the examination fee remain as it is and requiring a fee of five dollars additional for those who successfully pass the Board. This is the law in Illinois, and the fee thus increased is less than is paid in almost every other state.

The expert committee, appointed by the Executive Council, as provided by the Legislature, in calling attention to this deficit in their report recommended the payment of a renewal fee of one dollar per annum by all persons holding a certificate of the Board. Such a fee would be but a light burden upon those in practice and would not only meet, with the examination fee as it now is, all the expenses of the Board but would enable the Board to keep in touch with every legalized practitioner in the state and to detect and root out more readily those who were violaters of the law.

The Legislature could further promote the interests of the people and enable the State Board of Health to furnish some very valuable information if section 2565 of the Code were so amended as to include the proceedings of the State Board of Medical Examiners together with a list of legalized physicians in the State in the biennial report of the Secretary.

III

EMBALMERS' DEPARTMENT.

For several years sanitarians and health organizations have recognized the danger to the public health of exposure to bodies dead from infectious diseases, and the necessity of the adoption of measures of prevention. Railroad and other common carriers show a disposition to promptly and heartily co-operate with health organizations in the adoption of rules and regulations respecting the transportation of corpses. Sixteen or seventeen years ago the president of this Board, Dr. W. S. Robertson and the SECRETARY, the writer hereof, together with members of the Illinois and Minnesota State Boards of Health met at the Pacific Hotel, Chicago, with the several general baggage agents of railroads of the Northwest and discussed at length ways and means of safely transporting dead bodies—especially those dead of infectious diseases—with the least possible danger to the public.

As a result rules were proposed which were adopted by the General Baggage Agents Association, and subsequently by various State Boards of Health; by the American Public Health Association, and by the National Conference of State and Provincial Boards of Health.

These rules were subsequently revised and amended until the following became the rules for transportation as adopted by the above named organizations.

RULE 1. The transportation of bodies dead of Smallpox, Asiatic Cholera, Yellow Fever, Typhus Fever or Bubonic Plague is absolutely forbidden.

RULE 2. The bodies of those who have died of Diphtheria (Membranous Croup), Scarlet Fever (Scarlatina, Scarlet Rash), Glanders, Anthrax or Leprosy. shall not be accepted for transportation unless prepared for shipment by being thoroughly disinfected by arterial and cavity injection with a proved disinfectant fluid (b) disinfecting and stopping of all orifices with absorbent cotton, and (c) washing the body with disinfectant, all of which must be done by an embalmer holding a certificate as such approved by the State Board of Health. After being disinfected as above, such body shall be enveloped in a layer of cotton not less than one inch thick,

completely wrapped in a sheet and bandaged, and encased in an air-tight zinc, tin, copper, or lead lined coffin, or iron casket, all joints and seams hermetically soldered, and all enclosed in a strong, tight wooden box. Or, the body being prepared for shipment by disinfecting and wrapping as above, may be placed in a strong coffin or casket, and said coffin or casket encased in an air-tight zinc, copper or tin case, all joints and seams hermetically soldered, and all enclosed in a strong outside wooden box.

RULE 3. The bodies of those dead from Typhoid Fever, Puerperal Fever, Erysipelas, Tuberculosis, Measles, or other dangerous communicable diseases, other than those specified in rules 1 and 2, may be received for transportation when prepared for shipment by filling cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a sheet and bandaged and encased in an air-tight coffin or casket, provided that this shall apply only to bodies that can reach their destination within forty-eight hours from time of death. In all other cases such bodies shall be prepared for transportation in conformity with rule 2. But when the body has been prepared for shipment by being thoroughly disinfected by an embalmer holding a certificate as in rule 2, issued by the state health authorities, the air tight sealing may be dispensed with.

RULE 4. The bodies of those dead from diseases that are not contagious, infectious or communicable may be received for transportation when incased in a sound coffin or casket and enclosed in a strong outside wooden box, provided they reach their destination within thirty hours from time of death. If the body cannot reach its destination within thirty hours from time of death it must be prepared for shipment by filling the cavities with an approved disinfectant, washing the exterior of the body with the same, stopping all orifices with absorbent cotton and enveloping the entire body with a layer of cotton not less than one inch thick, and all wrapped in a bandage and encased in an air-tight coffin or casket. But when the body has been prepared for shipment by being thoroughly disinfected by an embalmer holding a certificate as in rule 2, issued by the state health authorities, the air-tight sealing may be dispensed with.

RULE 5. In case of contagious, infectious or communicable diseases the body must not be accompanied by persons or articles which have been exposed to the infection of the deceased, unless certified by the health officer as having been properly disinfected; and before selling passage tickets agents shall carefully examine the transit permit and note the name of the passenger in charge, and of any others proposing to accompany the body, and see that all necessary precautions have been taken to prevent the spread of the disease. The transit permit in such cases shall specifically state who is authorized by the health authorities to accompany the remains. In all cases where bodies are forwarded under rule 2 notice must be sent by telegraph to the health officer at destination, advising the date and train on which the body may be expected. This notice must be sent by or in the name of the officer at the initial point, and to enable the health officer at destination to take all necessary precautions at that point.

RULE 6. Every dead body must be accompanied by a person in charge, who must be provided with a passage ticket and also present a full first-class

ticket marked "corpse" for the transportation of the body, and a transit permit showing the physician's or coroner's certificate, name of deceased, date and hour of death, age, place of death, cause of death, and, if of a contagious, infectious or communicable nature, the point to which the body is to be shipped, and when death is caused by any of the diseases specified in rule No. 2, the name of those authorized by the health authorities to accompany the body. The transit permit must be made in duplicate, and the signatures of the physician or coroner, health officer and undertaker must be on the original and duplicate copies. The undertaker's certificate and pasteur of the original shall be detached from the transit permit and pasted on the coffin box. The physician's certificate and transit permit shall be handed to the passenger. The whole duplicate copy shall be sent to the official in charge of the baggage department of the initial line, and by him to the Secretary of the State, or Provincial Board of Health of the State or Province from which said shipment was made.

RULE 7. When the dead bodies are shipped by express the whole original transit permit shall be placed upon the outside of the box and the duplicate forwarded by the express agent to the express agent and Secretary of the State or Provincial Board of Health of the State or Province from which said shipment was made.

RULE 8. Every disinterred body dead from any disease or cause shall be treated as infectious or dangerous to the public health, and must not be accepted for transportation unless said removal has been approved by the State or Provincial Health authorities having jurisdiction where such body is to be disinterred, and the consent of the health authorities of the locality to which the body is consigned has first been obtained; and all such disinterred remains must be enclosed in a hermetically sealed (soldered), zinc, tin or copper lined coffin or box.

The foregoing rules were adopted by the Iowa State Board of Health November, 1897, and on May 11, 1898, the following regulations were adopted to carry them into effect:

TRANSPORTATION OF CORPSES

First.—It shall be the duty of every Funeral Director, Undertaker, or Embalmer within the State who may desire recognition by transportation companies and common carriers, for the transportation of the bodies of human beings dead from Diphtheria, Scarlet Fever, Glanders, Anthrax or Leprosy, to conform to regulations made therefor by the State Board of Health to-wit:

Second.—He may make application to the State Board of Health for a permit to prepare such bodies for transportation. Said application shall contain his full name, age and place of residence, and the certification of two legal physicians of good repute in the place where he resides.

He shall pass an examination before the State Board of Health at such time and in such manner as the Board may determine. Said examination shall comprise the following subjects:

- (a) The visceral anatomy and vascular system of the human body.
- (b) The comparative value and action of disinfectants and germicides.

(c) The proper method, after embalming, for further safely preparing bodies for transportation.

(d) The meaning of "contagion," and "infection;" the dangers they beget, and the best methods of their restriction and arrest.

(e) The signs of death, and the best methods of their determination.

And such other topics, general and special, as the Board may from time to time determine.

Seventy-five per cent of satisfactory answers in a scale of one hundred shall be required to entitle the applicant to a permit.

Third.—Upon satisfactory evidence of the competency of the applicant as an embalmer, he may be granted a permit to prepare corpses herein designated for transportation upon the payment of the sum of five dollars, to pay the expenses of such examination. Said permit shall be limited to the term of one year, and shall be signed by the President of the State Board of Health, and attested by the Secretary and seal of the Board.

Permits may be renewed upon the payment of one dollar within thirty days after the expiration of the term of a permit.

Fourth.—The failure of the holder of a permit to comply with the regulations of the State Board of Health shall be deemed sufficient cause for the revocation of his permit.

Fifth.—The Secretary of the Board shall keep a record in which shall be registered the name and residence of all persons to whom a permit is granted and the number and date of the permit, which record shall be for the information of the profession, the public and for transportation companies.

He shall also keep a record of all money received, expenses incurred and paid under these regulations, and make report thereof at each quarterly meeting of the Board.

Sixth.—Bodies of those who have died from diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), glanders, Anthrax, or leprosy, may be transported by common carriers upon the affidavit of a funeral director, undertaker or embalmer, made under oath, that he is the holder of a permit from the State Board of Health, giving the number of the permit, his name and residence, and certifying that the body has been prepared for shipment in accordance with the regulations of the State Board of Health, to-wit:

In the case of Diphtheria.—The body shall be thoroughly injected with a proven disinfectant embalming fluid, and all orifices of the body, such as the nares, mouth, rectum, and vagina in the female subject, then plugged with absorbent cotton. The body shall then be washed in the disinfecting fluid and wrapped in absorbent cotton layers one inch thick, then bandaged and placed in an air-tight zinc or metallic case.

In case of Scarlet Fever.—All clothing must be removed from the body, and the whole arterial system and cavities, including the cerebro-spinal, injected with a disinfectant of the highest germicidal powers. The body must then be thoroughly washed with the disinfecting fluid; all orifices plugged with absorbent cotton then covered with absorbent cotton one inch thick, then bandaged and placed in an air-tight zinc or metallic case.

In case of Glanders, Anthrax or Leprosy.—After protecting the hands by either vasline or gloves, all clothing which has been around the body shall be removed and burned. The body shall then be thoroughly washed

with a disinfectant of the highest proven germicidal powers, and sufficient of the disinfectant and embalming fluid injected into the circulatory system to thoroughly saturate all the tissues of the body. All the main cavities of the body shall be filled with the disinfectant, and all orifices plugged with absorbent cotton. The body shall then be washed with the disinfectant, wrapped in absorbent cotton not less than one inch thick, then bandaged and placed in an air-tight zinc or metallic case. When the condition of the body demands the removal of the blood, it may be removed by using a bottle which contains not less than four ounces of the disinfecting fluid. The vein selected for the operation must be opened carefully and the tube introduced to the right auricle of the heart, and the blood aspirated into the bottle without exposing it to the air of the room, or without coming in contact with the hands of the operator.

Seventh.—Disinfectants referred to herein must be approved by the State Board of Health.

Eighth.—The foregoing rules shall go into effect, and be in force on and after September 1, 1898.

R. E. CONNIFF, M. D., *President*.

J. F. KENNEDY, M. D., *Secretary*.

Since the adoption of these regulations providing for the education, examination and licensing of embalmers there has been a wonderful improvement in the personnel of the undertakers of the state. Those who desire to stand at the head of their profession, and to be recognized as holding embalmers permits took up the study of the scientific features, as well as the technique, of their profession; they attended schools of embalming; became more interested in their professional Associations and promptly and cheerfully availed themselves of the opportunities to take the required examination.

The question of taking the examination or not was left entirely at the option of the party interested. While the statute, chapter 16 of the Code, gives the State Board of health a general supervision of the lives and health of the people, yet the board was advised that it had not the right under the law to require a fee as a condition for taking the examination, nor had it the right to interfere with the work of the undertaker so far as he complied with the rules for the transportation of corpses as above given.

The advantage to the educated licensed embalmer was that by virtue of his proficiency as shown by a successful examination, he was premitted, and the railroads were authorized and agreed to transport bodies dead of diphtheria, scarlet fever, glanders, anthrax or leprosy that under the rules could not be otherwise received for transportation.

Since the adoption of the regulations providing for the issuance of these permits there have been held eight examinations—two of which were in connection with the meetings of the State Funeral Directors Association outside of Des Moines—viz. at Waterloo and Boone.

As a result of these examinations there have been issued four hundred and sixty-six embalmers licenses. The Board subsequently passed a resolution agreeing to issue licenses to undertakers of other states who were possessors of embalmers licenses granted upon examination by their respective State Boards of Health upon the payment of the fee, without examination—provided like courtesy was shown to licensed embalmers of this state. Several states have promptly signified their willingness to thus reciprocate; and one party holding an Illinois license has been awarded, on these conditions, a license by this board making the total number of licensed embalmers in Iowa four hundred and sixty-seven.

In addition to the examining and licensing of embalmers this department has printed the transportation permits used all over the State, and printed and issued all the application blanks and disinterment blanks and permits used by the Board and has paid for the same out of the fees received for examinations. In this way the State has had the benefit of a most valuable sanitary service without any expense. Before the organization of this embalmers' department the cost of the printing and distribution of blanks and permits relating to the disinterment and transportation of corpses was paid out of the appropriation for the State Board of Health.

From the time of the adoption of the regulation relative to the issuing of embalmers' licenses, May 11th, 1898, to the end of this biennial period, June 30th, 1901, there have been issued from the office of the State Board of Health 1,623 ordinary disinterments—1,217 of which were within the last biennial period; and 120 special permits of which 96 were within the period ending as above stated. The special permits referred to were granted in cases of death from infectious diseases—principally diphtheria and scarlet fever, and imposed the following conditions upon those interested:

1. That the disinterment is for the purpose of re-interment in another part of the same cemetery, or in a cemetery nearly contiguous.
2. That the removal shall not be by any public conveyance.

3. That the removal shall be done at an hour when there is the least possible exposure of other persons.
4. That no children shall be present, and only such persons as are actually necessary.
5. That the coffin shall not be opened.
6. That the sexton and all other persons engaged in such removal shall immediately thereafter change their clothing and properly disinfect or burn the same, and shall thoroughly disinfect their hands, head and face.

The time is not far distant when the methods of disinfection shall be so reliable and the skill of the embalmer such that bodies dead from smallpox, asiatic cholera, plague and yellow fever will be transported as safely as though dead of scarlet fever and diphtheria. Indeed, Michigan, through its Board of Health, has already expressed such confidence in her licensed embalmers that the restrictions against the transportation of bodies dead of infectious diseases heretofore prohibited by all other Boards have been so modified as to permit their transportation under certain prescribed conditions.

The State of Iowa was one of the first to adopt these rules relating to the transportation of dead bodies and the first to provide for the examination and licensing of embalmers, and it is a source of great gratification and commendable pride to find that the means of safety thus adopted have become well nigh universal so far as Canada, the United States and Mexico are concerned. In taking up this line of work the Board builded better than they knew, not only in conserving the public health but at the same time making it possible, without danger, to grant those bereaved the comfort and satisfaction of having their loved ones, though dead of contagious disease, repose in places of their own selection.

IV

LEGISLATIVE SUGGESTIONS

One of the duties of the Secretary in respect to the preparation of the biennial report, as required by section 2565 of the Code, is to make "such suggestions as to further legislation as may be thought advisable."

In compliance with this requirement the following suggestions are respectfully submitted:

APPROPRIATIONS

When the State Board of Health law was enacted in 1880, the appropriation per annum was fixed at five thousand dollars. Notwithstanding the work of the Board has been greatly increased, covering subjects of sanitation not thought of, and greatly increasing the expenses of the Board, the appropriation has remained the same as it was twenty-one years ago. The State Board of Health, through its oil inspection service, organized since 1880, not only is no expense to the State, but pays into the State Treasury much more annually than double the amount received by it by appropriation. To meet the legitimate demands of the Board, and to provide for original bacteriological, chemical and other sanitary investigations, the appropriation should not be less than seven thousand five hundred dollars annually.

The per diem of the members of the Board should be increased to ten dollars instead of eight as provided by the present code; the Secretary should receive a salary of not less than fifteen hundred dollars per annum instead of the twelve hundred now paid, and section 2575 should be further amended so as to insert after the word "office" the words "except postage and stationery," which shall be drawn from the supply department of the State.

VITAL STATISTICS

A glance at the data respecting "vital statistics" as shown elsewhere in this report will show that something should be done

to either repeal section 2566 and all of 2567 after the words "immediately preceding," or enact such penalties as will secure on the part of the assessors a better observance of the law; or else return to the old law requiring the physicians to report births and deaths. Vital statistics are of no benefit unless approximately correct. The physicians are the legitimate—the natural—agents for reporting births and deaths, and should under proper penalties be required by law to make these returns. They should also be reasonably compensated therefor. The reports of marriages are as nearly correct as could be expected, and are consequently quite reliable.

REPORTING INFECTIOUS DISEASES

It is painfully and dangerously apparent that a considerable number of physicians holding certificates from the State Board of Medical Examiners either through ignorance or a disposition to shield their patients from quarantine fail or neglect to report to the proper authorities cases of diphtheria, scarlet fever, smallpox and other infectious diseases as required by the regulations of this Board. The Board has disciplined some of these physicians, but its authority in such cases, so far as suspension from practice or revocation of the certificate is concerned, has not as yet been determined by the courts, nor is there as yet any direct legislative enactment in regard to this matter—the only provision for such discipline being the rather indirect question of "incompetency" as found in section 2578 of the Code.

In order that there may be no question as to the powers of the Board in regard to this matter, a prominent attorney has suggested the following amendment to section 2570 of the Code:

"Any person who shall purposely conceal or withhold information of any case of smallpox, varioloid, scarlet fever, or other quarantinable disease from the legally constituted public health authorities of the locality in which the same may occur, shall be punished on conviction thereof by a fine of not less than one hundred, or more than five hundred dollars, or by imprisonment for not less than six nor more than twelve months, or by both fine and imprisonment at the discretion of the court. And in case the person offending is a physician or holds a license from the State Board of Medical Examiners, in addition to the above penalties, his license shall be suspended, and on conviction of a second offense, it shall be permanently revoked."

STATE BOARD OF MEDICAL EXAMINERS

The fees received from applicants for certificate are not adequate to meet the expenses of this Board. Three methods are suggested by which these expenses might be more nearly, if not entirely, provided for.

First—The fees for itinerant physicians' permits issued by the Board, under section 2581 of the Code, might be paid into the Board for its use instead of into the State treasury for the use of the State. As the State is at no expense whatever on behalf of the Board of Medical Examiners such a disposition of these fees would only be just.

Second—The fee for examination might remain as at present with an additional fee of five dollars for the certificate where the examination is successful. This is the requirement in Illinois and would increase the fees of the Board thirty-three and one third per cent.

Third—A renewal fee of one dollar annually, might be required of each physician holding a certificate from the Board, as is the case with those holding pharmacy certificates. In addition to this plan furnishing an ample income, it would have the advantage of enabling the Board to keep in intimate touch with every legitimate physician in the State, or out of the State, who desired to keep his certificate in force. It would also enable the Board to furnish for publication with this report a reliable roster of all the legal medical practitioners of the State.

V

RAILROAD ACCIDENTS AND CAR SANITATION

The legislature of Iowa in 1892 enacted a statute requiring all railroads operating in Iowa to equip their cars with air brakes and automatic couplers. This was done to prevent accidents resulting from the ordinary methods of braking and coupling. As the change was expensive and required time, the period for full compliance with the law was fixed for January, 1, 1900.

It will be interesting to know what the results have been in the way of preventing accidents. The time since the last limit expired has been so short that valuable comparisons can hardly be instituted. The Iowa Board of Railroad Commissioners in its report for 1900 says relative to the compliance of the railroads with the statute above referred to: "It is the opinion of the Board that all railway companies operating lines within the State have substantially, or as nearly as may be, complied with the law with reference to equipping their cars with automatic couplers."

This report furnishes some interesting data relative to accidents occurring since 1882. From the tables given it is shown that beginning with 1882, the first tabulated report of accidents in Iowa, the following number of casualties have occurred to employees "from coupling cars" and "falling from trains:" The number killed, including the year 1900, from coupling cars, 199; from falling from trains, 385; total, 584.

Number injured, including 1900:

From coupling cars	3,408
From falling from trains.....	971
Total	<u>4,378</u>

As stated previously, the law requiring the change in method of coupling and braking was enacted in 1892. Inasmuch as but few of the roads could comply with the law for a year or two at least, and an extension of time was granted, but little reduction in the number of accidents could be expected at once. The records show the following, beginning with 1892:

ACCIDENTS TO EMPLOYEES FROM COUPLING CARS.

YEARS.	Killed.	Injured.	Totals.
1892	14	106	210
1893	10	106	206
1894	7	91	98
1895	5	80	85
1896	6	97	103
1897	7	80	87
1898	4	75	79
1899	12	72	84
1900	8	59	67
Total	73	946	1,019

ACCIDENTS TO EMPLOYEES BY FALLING FROM TRAINS.

YEARS.	Killed.	Injured.	Totals.
1892	28	63	91
1893	22	68	90
1894	17	32	49
1895	20	37	57
1896	19	35	54
1897	14	65	79
1898	18	50	68
1899	12	61	76
1900	20	59	79
Total	170	473	643

For the ten years prior to the enactment requiring air brakes and automatic couplers the casualties were as follows:

From both causes, 341; injured, 2,155, making a grand total of 2,496.

ACCIDENTS TO EMPLOYEES FROM COUPLING CARS

YEARS.	Killed.	Injured.	Totals.
1882	16	182	198
1883	16	98	114
1884	8	109	117
1885	13	174	187
1886	10	120	130
1887	9	134	143
1888	19	240	259
1889	8	149	157
1890	14	203	217
1891	13	242	255
Total	126	1,657	1,783

ACCIDENTS TO EMPLOYEES BY FALLING FROM TRAINS

YEARS.	Killed.	Injured.	Totals.
1882	31	57	88
1883	33	42	75
1884	10	57	67
1885	16	34	50
1886	25	38	63
1887	23	39	62
1888	32	52	84
1889	5	44	49
1890	17	83	100
1891	23	82	105
Total	215	498	713

Comparing the ten years prior to the passage of the law in 1892 with the nine years subsequent we have the following, respectively:

FIRST PERIOD.

Accidents to employes from coupling cars, 1882-1891: Killed, 126; injured, 1,657. Total, 1,783.

Accidents to employes by falling from trains, 1882-1891: Killed, 215; injured, 498. Total, 713. Total killed, 341; injured, 2,155. Total accidents, 2,496.

SECOND PERIOD.

Accidents to employes from coupling cars, 1892-1900: Killed, 73; injured, 946. Total, 1,019.

Accidents to employes by falling from trains, 1892-1900: Killed, 170; injured, 473. Total, 643. Total killed, 243; injured, 1,519. Total accidents, 1,662.

The grouping of the results for the period before the law with those subsequent may, at first glance, seem somewhat disappointing, and yet when all the facts are considered the State and the railroad authorities are to be congratulated and certainly have occasion to recognize the wisdom of the law.

In getting at the facts in regard to proportionate casualties for the two periods the number of persons employed constitutes an impotent factor. The records show the following:

NUMBER OF RAILROAD EMPLOYES.

YEARS.	Number.	YEARS.	Number.
1882	17,273	1892	30,192
1883	27,112	1893	31,127
1884	26,711	1894	29,308
1885	25,666	1895	24,107
1886	25,761	1896	28,165
1887	29,088	1897	26,690
1888	30,794	1898	30,009
1889	24,642	1899	32,784
1890	24,351	1900	37,696
1891	27,588		
Total	259,007	Total	269,739

It will be seen from the above that for the ten years preceding 1892 there were 259,007 men employed in the railroad service, of whom 126 were killed and 1,657 injured while coupling cars; and 215 were killed and 498 injured by falling from cars while braking, making the total killed 341, and injured 1,657; total 2,157 accidents.

For the nine years beginning with 1892 and including 1900, with 269,739 men employed, there were 73 killed and 946 injured by coupling cars and 170 killed and 473 injured by falling from

trains, making a total of 243 killed and 1,419 injured, or a total of accidents 1,662, showing 98 less deaths and 736 injuries to employes than for the ten years preceding. In justice it must be stated, however, that not all this favorable showing is to be credited to the use of the improved coupler and brake.

The morale of the men must be considered. It will readily be conceded that many of the accidents occurring in both the above named periods were occasioned directly or indirectly by the use of intoxicants, and the prohibition placed upon this habit by several of the companies employing the largest number of men has had much to do with not only preventing accidents to the employes but to passengers patronizing their lines and to others. By "others" are meant accidents at crossings, trespassing, stealing rides, or walking on the track. The report of the railroad commissioners shows the following additional relating to passengers and others:

YEARS.	KILLED.		Total.	INJURED.		Total.	Total.
	Pass.	Others.		Pass.	Others.		
1882	7	69	76	61	72	133	209
1883	4	65	69	25	50	75	144
1884	6	51	57	47	50	100	163
1885	9	75	84	89	66	155	239
1886	8	62	70	75	74	149	179
1887	8	65	73	28	58	86	156
1888	10	69	79	77	86	163	242
1889	4	33	37	25	46	71	108
1890	9	69	78	67	101	168	246
1891	5	91	96	80	92	172	268
1892	21	76	97	64	77	141	240
1893	17	79	96	78	64	142	238
1894	7	90	97	62	62	124	221
1895	4	82	86	39	74	113	199
1896	6	94	100	62	84	146	246
1897	27	90	117	81	86	167	284
1898	5	114	119	30	70	100	219
1899	14	95	109	101	128	229	338
1900	9	143	152	82	136	218	372
Total	182	1,512	1,694	679	873	1,553	3,247

The Board of Railroad Commissioners in speaking of these accidents to persons in Iowa says:

"Iowa has been singularly free, with very few exceptions, from railroad disasters resulting in great loss of life.

"Two notable exceptions have occurred within the past two or three years. Considering the greater number of trains now being operated, and the greatly increased speed of all trains, this condition in Iowa reflects great credit on railway management, and the integrity and reliability of the men whose duty it is to keep the track and roadbed in proper condition, and those employed in handling these trains. The public does not always ap-

preciate how much it owes to these employes, who daily guard the lives of thousands of people, and property to the value of millions of dollars."

While this is true, the fact must remain that much of the loss of life and injury to passengers as above tabulated, together with the loss of property, is the result in too large a measure of carelessness on the part of employes—mistakes in issuing or understanding orders and neglect in faithfully obeying proper orders when given.

The SECRETARY heartily congratulates the railroads of Iowa upon the above showing, and with the railroad commissioners believes that the people at large seldom appreciate the risk to life and deprivation of home and natural rest required, as well as the fidelity and integrity, of the great bulk of those who manage and operate these great commercial enterprises that are revolutionizing the world and making all peoples neighbors.

CAR SANITATION

The American Public Health Association, representing the Dominion of Canada, United States of America and the Republic of Mexico, for some years has had a Committee on Car Sanitation. The Committee has been made up of men of great ability, who have been faithfully and conscientiously striving to secure for the traveling public the best possible sanitary conditions with as little embarrassment to railroad managers as possible.

Prof. S. H. Woodbridge, of the Massachusetts Institute of Technology, Boston, is Chairman of the Committee. In behalf of the Committee he made a very interesting report at the meeting held in Indianapolis, Indiana, October, 1900. He had sent to seventy or more railroad companies of the Continent asking certain questions relative to the sanitary condition of their respective systems and asking their co-operation in securing greater uniformity and improvements along sanitary lines. Of the seventy thus addressed, thirty-nine failed to respond. One company, through its representative, replied as follows—the sentiments expressed reflecting possibly the position of many of those not in evidence:

"You ask a number of questions in regard to the care of cars which are not easy to answer, and which I hesitate to answer until I know the use you intend making of them. If this information is desired in the cause of science, that is one thing; if it is desired in order to compel the railroads through legislation to adopt expensive methods of sanitation, I hesitate very much to give you the information. I am quite certain that the railroad

with which I am connected, and other trunk lines in this vicinity, are doing quite as much in regard to protecting the traveling public against contagious diseases as they can afford to do, and it is quite a question in my mind whether any public or semi-public institution can be expected to do more for the public than the public will do for itself. Public opinion is such that people who ought to be in quarantine are traveling around at large, and it does not seem to me that you ought to expect transportation companies, hotel keepers, or other institutions to protect the public against them. Railroads are, as you know, considered in law 'common carriers.' They must carry whoever comes along, and regulations in regard to not spitting in cars, etc., are usually of no avail."

"In the matter of sterilized water at various places, it is a great question in my mind whether railroads can go into this matter. While waters of guaranteed purity are usually used in dining cars and eating houses, in the ordinary water tanks of sleeping and passenger cars, railroads simply furnish the best water which they are able to get from the cities and towns through which they run. Take for example, the city of Chicago, a very large proportion of the population drinks the lake water as it comes from the faucet, and this is what is supplied in the cars of all railroads running out of Chicago. A very small proportion of the population do not use this water at home and purchase water in bottles and cans. Would you contend that it was the duty of the railroad companies to furnish water to its patrons which was better and more expensive than those patrons would think of using in their own homes?"

"The steam railroads are at the present time in active competition with electric lines, especially in suburban traffic and traffic between large towns when not too far apart. The railroads furnish waiting rooms with appliances for the comfort of passengers on their trains which their competitors do not furnish, and many prominent railroad managers feel that they have already gone further than they can afford to in this direction."

The committee in its investigations acted upon the following well grounded assumptions:

1. The public through its chosen form of government has unquestionable right to protect itself from such preventable danger as it is in its power to control.

2. A danger is constituted whenever existing conditions are a menace to the best state of life, health, property, or happiness.

3. From various causes, many of the dangers to health increase in number and potency with the aggregation of persons in various conditions of health, and especially when such persons are assembled in illy-aired and illy-cleaned enclosures.

4. The public right is unchallenged to demand good hygienic conditions in all buildings and conveyances designed for public use and dependent, in their origin and operation, on public franchise.

5. The public standards, so far from being gauged by private, or family, or local habits, often conflict with and overrule them when the latter are at variance with the public good.

6. In the matter of public hygiene the State is supreme over any part of its contained communities and industries."

They submitted to the Association the following general statement of principles for its consideration:

"1. Among the traveling public are some, and in the aggregate many, who are afflicted with contagious disorders which may be communicated to the well through emanations transmitted as microbic dust and conveyed through the air, either directly from person to person, or after lodgment and short or long retention on surfaces or in textile fabrics.

The well, whenever in close proximity to, or confined with, those who are ill with communicable diseases, or who occupy uncleansed apartments previously occupied by such sick, or who use unsterilized or otherwise inefficiently treated bed-clothing or drapery previously used by them, are exposed to a preventable danger. So also are those who are furnished with unwholesome drinking water or foods.

Air, through its capacity for floating and carrying vaporous and minute solid material, is one of the principal vehicles by which disease is transmitted from the sick to the well. The greater the air supply furnished breathers the more the disease emanations are diluted, and the less dangerous the air and its contents become to the breather, and the more vigorous the latter's vitality is made by the abundance of air furnished and the consequent purity of the air breathed. The less the air supply, on the other hand, the greater the concentration of the microbic dilution, the lower the breather's vitality, and the greater his danger becomes.

2. The more absorbent, porous, rough, recessed, fluted, carved, or shelf-like the material or the surface exposed to air to any degree laden with microbic dust, the greater the amount of such floating material absorbed or lodged and held by them, to be dislodged and again floated whenever or however sufficiently disturbed. Hence the advisability and sanitary necessity of furnishing no avoidable harbor for the retention of dust.

3. Car sanitation, simply stated, is car cleanliness; cleanliness of the car itself and of its contents—including the furnishings, its air, and its supply of water and food. As the most dangerous poisons are those which are tasteless, so the most dangerous dusts or dirt is those which are not visible. It is because of the invisibility of danger that it is too often disregarded as imaginary, and the counsels of the benefactor, to whom the things unseen are the real, are scouted as the alarms of a dreamer. The emphatic trend of modern pathology is toward what may be termed the microbic or zymotic origin of all contagious disease, the dust or dirt origin, as it might be called; the invisible but dangerous dust in air, on clothing and furnishings, in water and foods.

Car sanitation, therefore, affects the building and the furnishing of cars, their ventilating and cleaning,—the water and food supply."

RECOMMENDATIONS

1. *Passengers Known to be Ill with Contagious Diseases*—When a passenger is known to be contagiously ill, he should be isolated in a compartment, appropriately equipped, and thoroughly ventilated in a manner to atmospherically separate it from, and to protect, the rest of the car. Through cars or trains should be provided with sick rooms, as well as state rooms, interchangeable in use, if necessary, and for the use of which charge

may properly be made proportionate to the service rendered to the individual and the public.

2. *Construction of Cars*—The interior of passenger cars should be furnished with hard, smooth and polished surfaces. All surfaces should be smooth and plain. Carvings, mouldings, groovings, flutings and all so called ornamental work which furnishes lodgement and harborage for dust and dirt should be avoided.

3. *Furnishings*. The furnishings of floor, seats, windows, draperies, should be as nonabsorbent as practicable. Wherever admissible, carpets and matting should give place to impervious material for plush in seat and seat-backs some impervious material should be substituted; curtains of suitable nonabsorbent material should be used, rather than slatted blinds in windows. Floor coverings, seats, draperies, and window curtains should all be made easily removable for cleaning.

4. *Ventilation*.—Coaches should be furnished with effective means for continuously supplying not less than 1000 cubic feet of warm air an hour for each chair or other single seat with which the car is provided and for distributing and removing the air in an effective manner for doing ventilating work without troublesome draught.

5. *Temperature Regulation*—The artificial temperature of the car should be so controlled either manually or automatically as to prevent the debilitating effects of over heating, and the still more harmful effects of chill, or of wide range temperature fluctuations.

The excessive summer heat of cars brought from yards to be made up into trains should be mitigated as much as practicable by shedded yards, protected car roofs, open deck windows and also side windows while the cars are in the yard; or, if need be, by sprinkling the car roofs.

6. *Car Cleaning*—The cleaning of cars should be frequent and thorough and without much, and certainly not exclusive, reference to evident dirtiness, since danger from this cause cannot be safely guarded by dirt quantity, nor indicated by its conspicuity.

The cleaning of all removable furnishings should be done outside the car, and, when weather conditions permit, all other cleaning should be with wide open windows and doors.

The feather duster should be used only with wide open windows, and for the purpose of lifting dust so that it may be removed by a strong through current of air.

Under ordinary conditions interior dusting should be done by means of dampened cloths.

When the cars are in transit and occupied by passengers any method of cleaning which stirs up and floats the dust from the floor or furnishings should be prohibited. The brushing of floor or carpets with whisk brooms, the brushing of clothing in the open car, the porter's manœuvring for a tip, should be discouraged.

7. *Disinfectants*—Floors should be washed frequently with suds and an added disinfectant of simple, orderless and effective nature. The sanitary and lavatory fixtures should be similarly and frequently treated with a disinfecting wash.

8. *Sterilizing Treatment*—Thorough cleaning of all fabrics by beating, air blast, dusting, airing and washing should be supplemented by occas-

ionally subjecting the entire interior car and contents to disinfectant treatment by sterilizing gases, vapors or fumes, and by methods of recognized efficacy. Such treatment should be followed whenever any known or suspected case of communicable disease is found among the passengers, and periodically, even though such cases do not appear.

All bedding, including mattresses, pillows, blankets and curtains; should be similarly treated, being always thoroughly aired and otherwise cleaned after each use, and sterilized promptly after exposure by a suspected or known case of contagious disease.

All bed and lavatory linen should be thoroughly sterilized in the process of laundering.

9. *Excreta*—The practice of disposing of excreta by scattering it over roadbeds is both dirty and dangerous—alike to the passenger and to the public. Such material on drying contributes to the dust of the road and in the cars, and becomes part of the floating contents of the air of the cities and the country through which the roads run. Convenience in disposal affords no adequate excuse for the maintenance of this slovenly, filthy and dangerous practice. Sewage tanks and earth closets should be provided under the cars.

10. *Water and Ice Supply*—Water and ice should be obtained from the purest available source, and none should be used from any source, which has not been proved by reliable tests to be safely free from harmful contents. If natural water and ice of such quality cannot be obtained, then the water should be treated by the most appropriate and effective method for its purification, and ice should be artificially made from purified water.

Ice should no more be handled by bare and soiled hands or by dirty gloves than drinking water should be poured over such hands or gloves into the water holder. The use of ice tongs should be insisted upon.

11. *Water tank*—The water tank should be shaped and placed with reference to easy access to its interior for cleaning. It should be frequently cleaned and periodically sterilized with boiling water or otherwise.

12. *Drinking Cups*—The public should be discouraged from using common drinking cups, and educated to use individual cups. To this end, a conspicuous notice might well be posted at the drinking fountain cautioning passengers against the danger of the public cup, and parafined paper cups, might be supplied by a "cent-in-the-slot" device.

The vertical jet method of furnishing drinking water—in successful use in some buildings in this country—is the safest conceivable and the best, aside from the difficulty of adapting a jet to all ages, and from the waste incident to its use by many unaccustomed to drinking water jetted into the mouth.

13. *Food*—The use of canned goods in buffet car service makes careful inspection of such goods imperative. Reports of sickness directly traceable to canned edibles served on trains have occasionally reached your committees. Fruits and all edibles should, before and after purchase, be stored with care to avoid all unnecessary exposure to street and car dust.

14. *Fouling of Cars*—Cars should be protected against all unnecessary fouling. The filthy habit of spitting on car floors should be dealt with in a manner to cause its prompt discontinuance. The nastiness should everywhere be made punishable, and should be punished as one of the most

flagrant of the thoughtless offenses against the public right to health. Prohibitory notices should be posted in all cars and suitable and sufficient cuspidors should be provided for the use of passengers. The experience of street car conductors show that a great reform can be wrought in this matter without serious difficulty.

15. *Station Premises*—Station premises should receive attention direct to general cleanliness of floors, furnishings, air, sanitariums, lavatories, platforms and approaches, and should be plentifully supplied with approved disinfecting material, and with pure water and safe means for drinking it."

VI

TYPHOID FEVER

The amount of typhoid fever that exists in any given locality is largely, if not wholly, the measure of the efficiency of methods of disinfection in some previous case. The patient may have been miles away—in the country or upon the mountain side—and the city or village whose water or milk supply has been contaminated with the infected stools or other secretions from the patient suffers the consequences.

Typhoid fever is a very serious, lingering and largely fatal disease, and only exists by the too often criminal carelessness of those whose duty it is to prevent its spread by proper disinfection.

The cause of typhoid fever is indisputably and definitely settled, and so generally recognized that there is a growing conviction among sanitarians that it has no right to exist among intelligent people.

It is not usually considered a contagious disease in the sense that smallpox and measles are, yet it has been fully and frequently demonstrated that foul odors, arising from soiled bedding and clothing, and from typhoid excreta, can and have produced the disease in others.

The theory held and promulgated by the most eminent sanitarians, and most careful and conscientious observers is that the disease is the result of a special contagium.

It is further demonstrated that this specific poison is always present in the discharges from the bowels of typhoid fever patients, and possibly in that from the kidneys. It is generally believed that these excreta are comparatively innocuous when first discharged, but that soon after, by a peculiar fermentative process they acquire their dangerous character.

This disease germ, or contagium, of typhoid fever is not only developed or vitalized after being thrown from the bowels, but seems to be indefinitely multiplied under the favoring conditions of heat, moisture and filth.

It is a well admitted fact that in a large majority of instances the disease germ is introduced into the intestinal track by means of food and drink—especially by contaminated water. The discharges are thrown into the privy-vault, or as was the case in the terrible epidemic at Plymouth, Pennsylvania, upon the ground—in either case, by percolation or by drainage, finding their way into the family well, or into the public reservoir. The drinking of this water; its use for cleansing (?) milk-cans, or for diluting milk; or the use of milk that has been exposed to air contaminated with the typhoid poison; the dissemination of sewer gas charged with noxious fever germs throughout dwelling houses badly plumbed; and the leachings from decomposing typhoid bodies into wells contiguous to cemeteries, are the more common and direct means by which the disease is propagated. There are cases on record where typhoid discharges were thrown upon the manure pile during the winter. The disease germ survived the rigors of winter, and when the heat and moisture of spring came, those who removed the manure were stricken down with the disease in a most malignant form.

In the case at Plymouth, referred to, the discharges from a typhoid fever case were thrown upon the frozen ground and snow, and in March the melted snow laden with the disease products of these excreta, found its way into the reservoir, and thence to families supplied with this water. The result was, in a few days one thousand one hundred cases of typhoid fever occurred, one hundred and seven of whom died. The causes leading to this outbreak were most thoroughly investigated, with every possible source of error eliminated, by the local physicians, as well as by physicians of Philadelphia and elsewhere, and the unanimous and indubitable conclusion was reached that it had its origin as above stated.

It has been demonstrated that the disease is most prevalent when the water used for drinking purposes is taken from wells in which the water is very low—the poison produced by the fever germ thereby being rendered more concentrated, and hence more noxious.

It is especially important that the fact that the presence of the special contagium of typhoid fever is necessary to produce the disease be kept in mind, since there are so many well authenticated cases where water highly polluted has been used, and though other filth diseases resulted, typhoid fever did not occur until the water became contaminated with the specific contagium.

The germ theory of the cause of typhoid fever is now *universally* admitted, and there is, at the present day, no better working theory from a sanitary point of view.

Typhoid Fever from Milk—There have been several notable epidemics of typhoid fever in this and other countries, caused by the contamination of milk. The disease germs are imparted either by the absorption of noxious exhalations from sewers or from the soiled body linen of typhoid patients.

From the foregoing statements relative to the cause of typhoid fever, it is apparent that there is no sentence, nor number of sentences that so happily and aptly expresses the most complete sanitary environment as the old one of Hyppocrates—"pure air, pure water and pure soil."

Prevention—Whatever will most promptly and efficiently prevent the contamination and promote the purification of the air, water and soil, naturally suggests itself as the best means of preventing and restricting the spread of typhoid fever.

The Hygienic Council of the French Academy of Medicine, fearing direct contagion, demand in all cases (1) isolation, (2) aeration of the chambers, (3) disinfection of the evacuations, (4) disinfection of the clothing, (5) disinfection of the room.

If the following rules were faithfully practiced, the number of cases of typhoid fever would be greatly lessened, and in time, the disease would be stamped out:

I. Strict cleanliness of homes and surroundings, including the burning of decaying chips and saw-dust, and the removal of decaying vegetables from the cellar.

II. Have all sewers and drain pipes connecting with the premises well trapped, and cess-pools and privy-vaults abolished, or at least one hundred feet from any well used for drinking or dairy purposes. The use of the dry-earth closet is greatly to be preferred to the ordinary privy-vault.

III. Isolation of the patient should be as rigidly enforced as possible, as much for the good of the patient as for that of the public. The drinking water, sewer connections and milk should also be critically examined with a view to ascertain the origin of the disease. Every case should at once be reported to the local board of health, as dangerous to the public health.

IV. All discharges of the patient should at once be disinfected, by being well mixed, a solution of corrosive sublimate (two drachms to one gallon of soft water), or with a solution of copperas (three pounds to a gallon of warm water), and if possible, buried

rather than thrown into the sewer or privy-vault. The corrosive sublimate solution, in the strength given above, should be kept in a large bottle or demijohn, properly labelled, and given to the nurse. Each evacuation immediately after its passage, should be covered with this solution and allowed to remain for fifteen minutes. A small quantity should be kept in the bed-pan in the interval of its use. Patients in no stage of the disease, even if able, should be allowed the use of the water-closet.

V. The water and milk used for drinking purposes during the run of the disease in a family should be boiled, and *the sale of milk from such infected premises should be prohibited.*

VI. Disinfection of clothing and bedding which can be washed, can be done in no better way than to put it through the ordinary operations of the laundry. Boiling for an hour will destroy the vitality of all known disease germs. Soiled clothing on removal from the person or bed of the sick should be *immediately* immersed in boiling water, or in a solution of corrosive sublimate (two drachms to one gallon of soft water).

VII. After death or recovery, the thorough disinfection and fumigation of the patient's room, and all its contents, should be enforced. To fumigate a room effectively, three pounds of sulphur should be burned in a room ten feet square. Every opening in the room, including flue, except one door, should be closed tight, and the furniture and contents of the room so arranged as to admit, as far as possible, the contact of the fumes on all sides. The sulphur should be placed in a shallow iron pan, and these on a couple of bricks in a tub containing water. Coal oil or alcohol should be poured on the sulphur, and a match applied. The person igniting the sulphur should at once leave the room, as the fumes are highly poisonous; and the door should be tightly closed. The room should remain closed twenty-four hours. A great many, with large experience and careful observation, place but little confidence in the sulphur fumigation. It is, if effectual at all, only so when done *thoroughly*. A more certain method, though destructive to wall paper, is to thoroughly wash the walls and woodwork of the room with the corrosive sublimate solution (two drachms to one gallon of warm water). After washing the wood-work, a coat of paint and varnish would "make assurance doubly sure."

VIII. The privy-vault and cess-pool, if any, whether the disease is present or not, should be disinfected at least *once every week* with a solution of copperas (one and a half pounds to a gal-

lon of water). One of the best and cheapest disinfectants is chloride of lime, which can be used in the proportion of one-fourth pound to a gallon of soft water.

IX. Good food, proper clothing, the avoidance of over work, mental or physical; in fact, whatever conduces to the best physical condition, contributes most largely to the powers of the system to successfully resist the encroachments of this disease.

There have been outbreaks of typhoid fever in a great many places in Iowa during the biennial period—in several places assuming epidemic proportions. Unfortunately the disease appeared in two of our public institutions, the Hospital for the Insane, at Independence, and at the Iowa State College, Ames. Drs. Hill and Harriman have kindly furnished reports of these outbreaks for their respective institutions.

IOWA STATE COLLEGE—REPORT OF THE SECRETARY OF THE STATE BOARD OF HEALTH

At the personal request of Mr. Hungerford, of Carroll, president of the board of trustees of the Iowa State college, Ames, I visited the institution October 26th, and by the personal assistance of President Beardshear, Professors Weems, Marston and others, made a thorough examination of the east and west cottages, the main building and Margaret hall, with the view of determining their sanitary condition, and also carefully inspected the water supply and system for disposal of sewage. President Beardshear accompanied me through the cottages and part of the main building used for recitations and as a dormitory. The east cottage did not impress me as being in good sanitary condition. The rooms were rather small and occupied by from two to three students each, sleeping in bunks one above the other with curtains hanging against them in front. The rooms are not well ventilated, the only means being by windows and a transom over the door opening into a hall running from one end of the building to the other. This cottage has three floors occupied, the upper floor having transoms over the door about 12x12 inches.

The west cottage I found in better condition, both as regards cleanliness, comfort and sanitary conditions, and the same may be said of the main building.

Margaret hall I regard as a model structure for the purposes intended. The rooms used as dormitories, by the ninety-six women occupying them, are large, well lighted and ventilated, and not over-crowded, and everything was neat, clean, and so far as could be found, in perfect sanitary condition.

The water supply is from a well twenty-two hundred and fifteen feet deep, and the water is stored each day in a high, closed iron tank, with a capacity of one hundred and sixty thousand gallons. The daily consumption for all purposes is ninety thousand gallons, so that if the tank were filled it would be entirely exhausted in less than two days. With the tank half full there is a pressure of fifty to sixty pounds to the square inch in the water main, thus making it impossible, should there be any leak, for germs to enter the mains.

The sewage, kitchen and laundry wastes are carried in cemented, glazed sewer pipes to a safe distance from the building on the college grounds, and are finally disposed of, after passing through a septic tank, by a modern and highly commended system of intermittent filtration—the effluent from which is a water clear and sparkling and free from odor. There are some interesting details in connection with this system of sewage disposal that I would be pleased to note for the benefit of others, but cannot here.

In addition to a careful examination of the buildings, water and food supply and the disposal of sewage, while on the grounds and since returning to the office, I have endeavored faithfully and impartially to get all the facts possible relating to the unfortunate outbreak of typhoid fever so as, if possible, to determine without doubt the source of the disease.

I have corresponded with Mr. Briley, a farmer near Ontario, from whom a part of the milk supply was obtained, and who during August and September had a daughter sick in his home with typhoid fever; with Dr. C. S. Hutchinson, of Ames, who attended the girl; with Hon. L. B. Robinson, of Harlan, a member of the board of trustees of the college who in behalf of the board spent three days on the college grounds in an endeavor to arrive at the cause; with Dr. W. E. Harriman, the medical officer of the college, having charge of the patients; with Professor Weems, who reports the results of analyses of water taken from nine different sources as follows: Skelton's well; Peterson's watering trough and well; Pritchard's tank and well; Briley's deep (180 feet) and shallow (forty-five feet) wells, and from the college laboratory and kitchen outlets. The first seven sources named were from farmers furnishing the college milk supply. I also have the report of Professor Macy, of Highland Park, the chemist of the State Board of Health, showing the results of his analyses of the same water. I have also the bacteriological reports of Professor Pammel, of the Iowa State college, and Dr. Eli Grimes, of Des Moines, the Bacteriologist of the State Board of Health. I have a communication from Mr. Henry Wallace, editor of *Wallace's Farmer*, in which he suggests the college water-supply as the possible cause of the disease, and a report of the college engineer regarding the insertion of a valve in the water main of the college.

After weighing carefully all the evidence in connection with my own personal observations I am fully convinced that the Briley milk was the cause of the outbreak.

My reasons for arriving at this conclusion are as follows:

1. The unsanitary condition of the east cottage must be eliminated as a factor in causing the disease, from the fact that no larger proportion of the students in this cottage were attacked than of the women in Margaret hall with all its sanitary advantages.

2. The cause cannot justly be attributed to the water supply. The college administration—the president, professors, their families, etc.—consisting of about two hundred persons, did not have a case of the disease.

Of the forty-two cases treated on the college grounds, forty were students—one, Mr. Prall, a sub-professor, and one a kitchen girl at the college dining hall. All these patients boarded at the dining room in Margaret hall, and all drank milk. At the time the water was reported "roily," and when the repair was made in the water main, the school was in vacation—only the Campus residents using it, none of whom, as above stated, contracted the

disease. If the water were the cause it would be reasonable to conclude that at least some of the administration and faculty, who used it continuously, not only when the school was in session, but during vacation, should have contracted the disease.

This negative argument in favor of the college water supply is strongly supplemented by chemical analysis and bacteriological investigation. Professor Pammel has furnished me a detailed report of his findings. Omitting details and speaking of organisms found in the college water supply, taken at different points, he says:

"It was a significant fact that morphologically none of the species found indicated either *coli-communis* or *bacillus typhosus* in the college water supply.

"Of the oft-repeated statement that sewerage contamination might have occurred, I wish to state that the writer, together with Professor Marston, climbed to the top of the tower and investigated conditions, and everything was found it in its usual good condition. There was certainly no indications of growth of algae on the water, nor were there any indications of other filthy condition. In fact, the water and everything connected with it seemed to be in an ideal state.

"The statement has also been made that, owing to the fact that the college at different intervals used the supply from the spring, in this way it became contaminated. An investigation of the college spring water, as well as of the different hydrants and cisterns, those of Professor Stanton, Professor Marston, and the old Sexton well, indicate, usually, good water, with the exception that in the Curtiss well and the Sexton well gas was produced, but this undoubtedly came from the surface soil. The spring water showed no gas whatever, nor was any obtained from the hydrants, which was next to the spring."

The bacteriological examination, by Dr. Eli Grimes, of samples of water taken from the college laboratory and the kitchen the 26th of October, failed to detect any sewage contamination, or the presence of typhoid-producing germs. This much for the college water supply, from a bacteriological standpoint. The same might be said substantially of the water supplies from all the other sources as examined, except that from the Briley shallow well. Of these samples, Professor Pammel says:

"In conjunction with Dr. Weems and Mr. McKinley, on another occasion, the writer collected samples of water at the Briley well, and at one time Mr. Faurot collected samples. It is a suggestive fact that the first time that we collected this water, and the second time when Mr. Faurot collected it, we got an unusually large number of germs per cubic centimeter. Various specimens were found. Some of these have been excluded as having no connection with *bacillus typhosus* or *coli-communis*. On the other hand, there are a number of species that belong to the typhosus group, culturally, so far as has been carried out, but as it is extremely difficult to run these species out on short notice, you will appreciate that more time will be needed to report on this fact: * * *

"In regard to the condition of the well it looks as though the water could easily have drained off from the surface, but nevertheless upon removing some of the boards from the top of the well I found that water might easily have entered between the cracks of some of the boards. In fact I found

moisture upon the upper tile so that one could readily see how that *coli-communis* or other foreign organisms could get into the water. Gas was produced in one tube poured by Mr. Fautot and a slight amount in another. In this case we made the usual test. We also obtained gas from the first plates that we poured."

Dr. Grimes' bacteriological examination of the samples furnished by Professor Weems were numbered respectively 1-9 both inclusive. No. 4 was the Briley water and No. 6 Peterson's watering trough. Dr. Grimes in his report says, "The number of bacteria per cubic centimeter was not determined owing to the age of the sample. Examination for color bacilli. Nos. 1, 2, 3, 5, 7, 8, 9, none. Nos. 4 and 6 present. This shows sewage contamination in 4 and 6, but no evidence of contamination in the remaining seven samples. (The college samples were 8 and 9 - Secy.) * * * The conclusion can be reasonably drawn that 4 and 6 are bad."

In speaking of the fact that he was not able to find the typhoid bacillus in the milk, Professor Pammel says: "In milk we are dealing with such a large number of species that it would be a mere accident to discover the organism. As said heretofore, it seems to me to be reasonable that the milk has formed a favorable medium for the growth of the organism, and be it specially remembered that Mr. Briley, from his own testimony, failed to wash the cans with boiling water, as should have been done. The milk cans could easily have been contaminated, and the failure on his part to wash the cans with boiling water, it seems to me, made it not only possible but probable that these germs were propagated in the milk." Professor Pammel says in conclusion: "A comparison of the water of the Briley well and the college effluent shows that the Briley well had a greater amount or contamination than the college effluent from the sewage filter beds:"

The chemical analyses by Professor Weems and Professor Macy, independently of each other, of the Briley shallow well, showed a high state of pollution, while the college water was shown to be excellent.

Believing the foregoing will be sufficient as to the sanitary condition of the college buildings, the water supply and the sewage disposal, I will take up:

3. *The Milk Supply for the Margaret Hall Dining-room*—At the time of the outbreak and for some time previous the milk was obtained from four dairies—farmers living near Ontario, Skelton, Peterson, Pritchard and Briley. Milk had been received from Briley during the fall, 1899, but complaint was made as to its keeping quality, but no contract made for 1900. In February, 1900, however, milk was again taken, but soon stopped for the reason given above. September 3, 1900, the Skelton supply being short, Briley again supplied the college. The average amount supplied was seventy-five pounds—six days prior to September 20th the daily receipts were as high as one hundred pounds. October 17th the Briley milk was discontinued, and all milk received after that date was sterilized.

The dining-room contains sixty tables, with eight students at each table. About three pounds of milk were served at each table, except to the tables occupied by the football team, who were given six pounds to the table, as they were encouraged to use a milk diet largely. In this connection it must be noted and borne in mind that no one who did not use of this milk contracted the disease, and that of the football team who used double the quantity fully fifty per

cent. took typhoid fever. Inasmuch, therefore, as any unsanitary condition of the buildings, the college water and the water at other points from which the milk was obtained, except Briley's, and the sewage disposal, must be eliminated as probable factors in producing the disease, since all were subjected to the same conditions, and, further, inasmuch as only those using the milk in Margaret hall dining-room contracted the disease a reasonable inference is that contaminated milk was the cause—especially as many similar outbreaks have been traced to the same cause. The question naturally arises, "Whose milk was it?" The following circumstances lead me to conclude that it was the Briley milk:

(a) The Briley milk was discontinued twice because of its poor keeping qualities, indicating the introduction of some agent that was injurious to it.

(b) The condition of the water showing sewage contamination in the Briley shallow well, and the use of this water for washing the cans—some of which most probably remained in the can, thus polluting the milk.

(c) Mr. Briley informed me that his daughter was taken sick with what Dr. Hutchinson, of Ames, called typhoid fever, August 3d. Dr. Hutchinson, who attended her, confirms this statement. Both say that a nurse was employed; that the discharges were disinfected and emptied into a pit two hundred feet from the well, with fresh earth raked over it each time; that at the same time the milk was furnished to the college Mr. Briley furnished one hundred and seven other persons with milk, and that none of these had typhoid fever. Mr. Briley stated that railroad men grading along the Chicago & North-Western railroad used freely of this shallow-well water, none of whom contracted the disease.

As offsetting these statements, however, it must be remembered that the existence of typhoid fever in any home, even with the best of care, is such a menace that the State Board of Health forbids the sale of milk or butter from dairies or homes where there are cases of any infectious disease. There is never an absolute assurance that disinfection has been so efficient as to destroy all disease germs. The vessel, after being emptied of its contents, might have been taken to this abandoned well and rinsed, and thus typhoid germs be introduced into a water that would afford, as shown by bacteriologic and chemic examination, a favorable medium for their multiplication. During the run of this disease there were a number of heavy rains that by some sub-soil communication may have carried the unsterilized germs into this well.

(d) In regard to the railroad men who drank of the Briley water Dr. Harriman says: "It develops that five of these men are now sick or have been sick this summer of typhoid fever. I am unable to furnish names and other data, owing to having only recently learned of their sickness and because of a lack of time."

Dr. Harriman further says: "Mr. Briley states that he furnished milk to one hundred and seven people residing off the campus, none of whom contracted the disease, but as a matter of fact three men went home sick from these places, and two are known to have had typhoid fever. In regard to the other, we have, at present, no definite knowledge. The two mentioned are Fred Hoeye, of Perry, Iowa, who boarded at Overhulser's, and W. S. Nichols, who boarded at Manheart's. The small number involved here is explained by the fact that most of these people used milk only in hot tea or

coffee—drank none as a beverage. Indeed, only at two places (Overhulser's and Manheart's) was milk used as a beverage; furthermore, the milk was kept in the patrons' cans, and not those of Mr. Briley. It is stated by those who have examined the milk that there was a great difference between this milk and that supplied to the college. Another significant fact bearing upon this matter is that of age. Many of the people in this list of one hundred and seven are above 45 years old—an age not especially predisposed to typhoid."

There were forty-two cases in all treated by Dr. Harriman—two of whom have died. The period of incubation is usually from two to three weeks.

Dr. Hutchinson says he began the treatment of the Briley girl August 4th and made his last visit, she recovering, September 10th. September 3d the college resumed the use of the Briley milk, having stopped it in February preceding. The disease made its appearance in the college October 8th, with three cases and subsequent cases occurred as follows: October 9th, one case; October 10th, two; October 11th, four; October 12th, seven; October 13th, two; October 14th, three; October 15th, seven; October 16th, three; October 17th, one; October 19th, two; October 20th, one; October 24th, two; October 27th, two and November 4th, two. The Briley milk was discontinued October 17th. It was expected that cases might occur in reduced numbers for three weeks from that time. The above record shows the last case occurred three days short of the three weeks.

Some parties have expressed doubt as to the disease being typhoid and in some instances where students have gone home it is reported that their attending physicians have pronounced the cases malaria. There is no question as to the character of the disease as treated at the college. They have been seen and examined by Drs. Priestley, of Des Moines; Wright, of Carroll; Harriman and Littig, Iowa City; Owen, of Williamsburg; Burton, of Colchester, Ill., and Dyer, of Gilbert, all of whom have not hesitated to pronounce it typhoid and unusually severe in type.

There is much more that might be said in support of the milk theory of infection, and in favor of the contention that the Briley milk was unfortunately the culpable agent.

The lesson to be emphasized is that food stuffs should not be sold from places where infectious diseases exist.

I ought to say perhaps before concluding, that the college authorities are not to blame for the sanitary condition of the east cottage referred to. They are, in the growing attendance upon the college, confronted by a condition that the legislature must meet.

J. F. KENNEDY,

Secretary.

DR. HAMINAN'S REPORT

This epidemic occurred at the State College of Agricultural and Mechanic Arts at Ames, Iowa in the fall of 1900.

The total number of cases was sixty-five. Of this number twenty-three went to their homes at the onset or early in the disease. Forty-two remained to be cared for at the college.

GENERAL ENVIRONMENTS

The college is located one and one-half miles from the town proper. It is situated on a one thousand acre plot of high rolling land, provided with

most excellent natural drainage, abundant exposure to sun and wind—and altogether one of the most naturally healthy spots in the state. The buildings are large and well constructed. Fitted with first class plumbing, water supply and sewage disposal—in short, are in good sanitary condition.

The enrollment of students at the time of the outbreak was about nine hundred. Many of them roomed at the various college dormitories. Margaret Hall, a building devoted to the lady students, contains also a large dining hall. Most of those students who roomed in college buildings, and a few additional students and faculty assistants, took their meals at this dining hall. Of those remaining, some lived in the dormitories, and dined outside the college, others both roomed and boarded entirely off the campus in private residences near the college or in the town proper. But all used the one water supply, closets, etc., while on the grounds.

This definite knowledge of the whereabouts, and customs of the entire student body rendered possible a systematic study of etiologic factors and warrants a somewhat detailed narration of the events which led to the discovery of the source of infection.

When it became apparent that the college was in the face of an epidemic, there was instituted a renewed study of the existing sanitation, and a determined search for the origin of the disease.

The problem was approached from the following vantage grounds:

First—sewers and sewage disposal; *Second*—water supply; *Third*—food supply; *Fourth*—all other possible sources.

SEWERS AND SEWAGE DISPOSAL

The closets of the various buildings, the laboratories, the creamery, the laundry and kitchen in Margaret Hall, as well as many of the faculty residences, are connected by individual outlets, with the main sewer. The sewers are of the most approved sewer tile, comparatively new and were constructed under the direct supervision of most thoroughly competent sanitary engineers. The plumbing is of the best, modern ventilated traps are used throughout, and are supplied with arrangement for abundant flushing. It has been the custom during the college term to give the sewers an extra flushing at least once each week. The system was inspected without the discovery of any defect whatever. No leak could have existed without detection to quantitative measurements of sewage, and other sewage experiments which were there in progress.

The sewage disposal system is that known as the septic tank and intermittent filtration process. This is the most modern and satisfactory system in use to-day. It is so successful that after the sewage has passed through the septic tank and through the bacterial filter beds, the effluent can scarcely be told by its appearance from the clearest sparkling well water. The principle upon which the plan depends entails the process of septic precipitation and bacterial consumption, combined with simple filtration. Time forbids a detailed account of the plant, within the confines of this paper, but for those who care to familiarize themselves with the system, reference is here made to complete explanation and description of the same by Professors Marston, Weems and Pammel of the college. A copy may be obtained of Prof. A. C. Marston, Ames, Iowa. Suffice to say this plant was in most perfect con-

dition and was heartily approved by Dr. J. F. Kennedy during his inspection of the entire college premises.

THE COLLEGE WATER SUPPLY

The water is pumped from a well 2,215 feet deep, into a large, tightly closed tank 160 feet above the surface, and is piped to the various college buildings and residences on the campus. The tank when filled contains one hundred and sixty thousand gallons. The daily consumption of water is 90,000 gallons. So that if the tank were completely filled, the regular demand would exhaust the supply in less than two days. However, as a rule, the tank is kept about half full, hence practically each days supply is freshly drawn from over 2,000 feet below the surface. When the tank is half filled, there is a pressure of sixty pounds to the square inch in the mains. Had there been even such a misfortune as a leaking main passing through a veritable culture bed of typhoid bacilli, the water would have found constant exit through the tank with such force as to have positively precluded the possibility of bacillary entrance.

The water had been examined each year, and always found in good condition. But not content with this, and the above negative evidence, it was again subjected to thorough chemic and bacteriologic tests and found to be in an exceptionally high state of purification. These analysis were made by Professor J. B. Weems, of the department of Chemistry, and Professor L. H. Pammel, college bacteriologist, and were confirmed by Professor Macey and Doctor Grimes, respectively, chemist and bacteriologist of the Iowa State Board of Health.

Failing to locate the difficulty in the college water supply, attention was called to the

BOARDING DEPARTMENT

Here, nothing leading to a clew was discovered until, in the investigation of food and its sources, there was reached the important item of milk.

THE MILK SUPPLY

At the beginning of the term, the college had contracted with one Skelton and one Pritchard (farmers near the college) for the necessary supply. But on September 2d, Mr. Skelton's supply having partially failed, he arranged with one Mr. Briley (another farmer), to make good the deficit. Mr. Briley did so, and in large amounts, from September 3d, to October 17th. The greatest amount having been delivered during the week from September 15th to 24th.

At the mention of the Briley milk the recollection at once occurred to the author, of the existence, nearly all summer, of a severe and prolonged case of Typhoid fever in the family of Mr. Briley. The case occurred in the practice of Dr. C. S. Hutchinson of Ames, who assured me of the correctness of diagnosis. Acting upon the suggestions of this coincidence the Briley milk was rejected in-toto, and all other milk subjected to Pastureization prior to its use. Investigation was further continued, but it was very interesting to note in this connection that the last case was bedridden November 3d, three days less than three weeks (usual limit of period of incubation) from the date on which the Briley milk was condemned.

ADDITIONAL WATER EXAMINATIONS

Specimens of water were obtained from Skelton's, Prichard's and Briley's wells, the latter having two wells. Both chemists and bacteriologists pronounced all the specimens free from suspicion except that from the shallower one of the two Briley wells. This water is said to have contained over 180,000 germs to the cubic centimeter—among them a bacillus somewhat resembling Eberth's bacillus—if not that identical organism, it was at any rate a member of the typhosis group. Prof. Pammel condemned the water emphatically. Regarding the chemic condition of this water, Prof. Weems reported as follows:

"The Briley wells two in number are situated about four feet apart. One having a depth of 180 feet, and the other 45 feet. The 180 foot well showed chemically to have water of excellent quality. The shallow well is, on the other hand, evidently contaminated from some source. The excessive amounts of nitrogen as nitrates and nitrites, and also chlorides, would indicate that some vault or outhouse was the cause of contamination. The results also indicate that a large amount of the organic matter in the original source of contamination had been oxidized by the process of nitrification. The water was in worse condition than the effluent of the college sewage beds." He continues further: "From a chemical consideration of the matter the conclusion of the investigation shows that the Briley shallow well is evidently the cause of the trouble, as it probably is in connection by some underground means with a vault. It would naturally result that should typhoid bacilli be introduced into the vault or outhouse the underground connection would transmit them to the well readily through the tile casing of the well. And the use of this water for washing milk cans and watering the milk would transfer the germs to the individual using the milk."

Mr. Briley admitted that he did not scald the milk cans, hence if bacilli were present in the water nothing hindered their development in the cans.

FURTHER FACTS REGARDING THE MILK

The milk collected in these unscalded cans was delivered at the college once each day, about 8 or 9 o'clock A. M. It was kept all day and used for supper, thus allowing an abundance of time for the development of bacilli. Owing to its tendency to sour easily it was kept separate from the other milk. The cook drew from this supply for cooking purposes but the greater portion remained to be used for supper.

The dining room contained 61 tables, with eight persons per table, making the total of 488 people in the dining room served at the same time. Three pounds of milk was served to each table except numbers 58 and 59, the patrons of which received a double portion, six pounds each. These were known as the training tables being patronized by sixteen football men in training—as fine specimens of muscular development and general physical resistance as one could wish to see. These students were encouraged to use their double portion of milk and it is a painfully significant fact that thirteen of those sixteen great, powerful fellows contracted typhoid.

Some of the Briley milk reached various parts of the room but a greater portion was distributed in the west half, and a greater number of cases occurred among those at that end. The younger students, many of whom were recently from rural homes, occupied this section, and being accustomed

to the use of milk at home as an acceptable food doubtless drank more than the older students. There were no cases among those who did not drink raw milk, and in every instance of sickness, upon interrogation regarding the milk, the patient replied that he had drank milk freely.

Whether the Briley well water contained the organisms and the milk became in this manner infected, or whether by flies passing from the dejecta to the milk cans in a tank near by, will never be positively known because of the destruction of the bacteriological laboratory and its contents by fire. Isolation experiments with the milk and with the Briley water were in progress when the disastrous fire occurred in the main building and destroyed all cultures and further means of determining the exact method of infection of the milk. But in the light of the above facts there can be no reasonable doubt as to the infectiousness of the milk, from whichever of the two sources it may have originated.

The following is the report of the outbreak at the hospital at Independence, as furnished by the superintendent:

INDEPENDENCE, IOWA, September, 14, 1901.

J. F. Kennedy, M. D., Secretary Iowa State Board of Health, Des Moines, Iowa.

MY DEAR DOCTOR—In accordance with your request I make report to you concerning the epidemic of typhoid fever at the hospital at Independence in 1900.

The records of this hospital show there were deaths from typhoid fever in the biennial period as follows: One in the second, two in the third, two in the seventh, nine in the thirteenth, one in the fourteenth and thirty in the fifteenth.

Two male patients were admitted in April, 1900, each of whom had a mild attack of typhoid fever immediately after entering the hospital. Seven cases were put to bed on account of this disease in July, seventy-one cases in August, 101 in September, thirty-three in October, eight in November and three in February, 1901.

In this total of 233 cases, 111 were male patients, seventy-seven were female patients, nineteen were male employees, fifteen were female employees and one was the wife of the Superintendent. Besides the deaths among the patients one female attendant was lost.

Somehow the water in the pipes, which has always been used with impunity to quench thirst, became impregnated with the germs of this disease. During the hot weather of June and July, 1900, this water was freely drunk, especially by patients and employees who were at work, so that in August the epidemic manifested itself in an extensive and serious manner.

In spite of the best care that could possibly be given these numerous cases there was a death rate of thirteen per cent. It is believed that by carefully watching the condition of the pipes, and by not drinking it when chemical and microscopic tests prove that it is dangerous, we will avoid typhoid fever hereafter.

Beginning on the top of page 140 of the second volume of the *Bulletin of Iowa State Institutions* you will find an article on this subject written by Dr. Boody.

Again, in July, 1900, as during the first two epidemics in 1896 and in 1898, the source of infection became a mooted question. The milk which

was produced on the farm was thought of as a possible carrier of contagion. Careful bacterologic examination carried out in every detail, as in the water tests to be described further on, proved the milk to be uncontaminated.

Specimens of water were collected into sterilized flasks, from the taps in all parts of the institution, also water with a silt-like sediment from the bottom of each standpipe, and 50 c. c. from each transferred to carbol-bouillon in flasks. After remaining twenty-four hours in the incubator, the bouillon in each flask presented a milky appearance, thus showing a marked growth of some kind. Under the microscope each of these live bouillon cultures was found to contain some sphero-micro-organisms, some very long thick non-motile rods, many bacilli, which in size and in every way, with the exception of the absence of the power of motility, appeared much like typhoid bacilli, and also many very motile rods, which, with the same magnification, were identical with parallel bouillon cultures from the stock of cultures of pure typhoid bacilli kept in the laboratory for the purpose of making Widal's blood serum tests. After careful study of all the cultures of the same generation and of many subsequent generations in this way, with the result that at the end of the step the motile rods had been constant, that they did not lose their identity and that they did not lose their points of similarity to the known cultured typhoid bacilli there seemed scarcely room for doubting that they were typhoid bacilli. The non-motile rods remained constant throughout all the generations cultured in carbol-bouillon, while the sphero-micro-organisms disappeared. This fact led to the belief that they might be colon bacilli. Stroke and spread cultures were now made on agar, and numerous single colonies were picked off, and as many separate tubes of Parette's hydrochloric acid carbol-bouillon inoculated, with the result that there were growths in each. Agar tubes were again inoculated and also plain bouillon tubes. The growths in some of these tubes, both agar and bouillon, were identical with the parallel growths of the known typhoid bacilli. Litmus milk was then inoculated from the agar and bouillon cultures of the suspected typhoid bacilli and it remained unchanged, thus proving them to be non-acid producing like the known typhoid bacilli, while inoculation of the known colon bacilli into litmus milk gave acid reaction, which is characteristic of this bacillus. The growth of the organism on potatoes was typical, stab cultures into glucose agar generated no gas in the path of inoculation and plain bouillon cultures reacted perfectly to Widal's blood serum tests, thus positively proving them to be typhoid bacilli. Other heavier colony cultures into bouillon and onto agar were proven, by subjecting them to tests, to be colon bacilli. *The source of infection was thus positively determined.*

Within the past few weeks the water was again subjected to the same rigid examination with the same results. It was found, however, that spreading cultures onto agar plates from very dilute plain bouillon cultures is a much more practical way of getting single colonies of the different organisms than by culturing onto agar in tubes and into gelatine plates. A few drops of a very dilute plain bouillon culture are spread onto an agar plate and carefully spread over its surface by a sterile rod bent at right angles, so that an inch or more of the rod will touch the surface at the same time, while it is gently and rapidly drawn over the agar surface.

During the epidemic last year, as soon as we were convinced that the

drinking water was the source of the disease, sterilized water only was used for drinking purposes. This spring and summer well water has been used. There have been no cases of typhoid fever here this season until the beginning of September, when four cases developed at once, one male and three females, located in different parts of the hospital. None of these cases have died up to date (September 14) and there have been no deaths from other causes so far this month, and the health of the patients has been remarkably good during the past spring and summer.

My theory is that there have been typhoid fever germs in the water pipes of this hospital for years; having got there by means of faulty plumbing and making it possible for water in some of the bath tubs to flow back into the cold water pipes, in case the latter happened to be empty, which condition has occurred occasionally when the water supply from the city was insufficient. The plumbing in this institution, for the most part, is the same in kind and condition that it was when placed twenty-five or thirty years ago. I expect a good sized appropriation from the next legislature, which is badly needed, and if secured will be used to overhaul all of the bath rooms and water closets in the institution, to wainscot the walls with marble, place the most approved water closets everywhere and substitute almost wholly for bathing purposes showers instead of tubs.

When these changes are made and we secure an ample supply of pure water from an artesian well, it is believed that we shall thereafter be entirely free from typhoid fever.

I am, very respectfully yours,

G. H. HILL.

VII

VITAL STATISTICS

Births, marriages and deaths constitute the most important events in life, and their record and tabulation constitute vital statistics. A correct record of these casualties form the basis for many important calculations, while their faulty record is misleading and worthless. Twenty-one years ago the Iowa State Board of Health was organized, and one of its specified duties under the law was to supervise a registration of births, deaths and marriages; and the proper machinery was provided for collecting the necessary data. There were defects in the law, however, and the results were unsatisfactory. Births and deaths were to be reported by physicians in attendance to the county clerk within a specified time, and these data together with the returns of marriages, were to be reported to the Secretary of the State Board of Health.

The law was never popular with the physicians, as it entailed considerable labor and often great inconvenience with no compensation therefor. The result was that the reports of births and deaths were not even approximately correct. The blanks were suitable and the returns apparently correct so far as they went, but for the reason above stated many such returns were not sent in at all. To secure better records, by removing the most objectionable feature, bills were from time to time introduced into the legislature to provide even a modest fee to physicians and midwives making such returns, but these bills never found favor.

To remedy the matter an expedient was resorted to by the legislature that has only made matters worse. The physicians were releived from their obligation under the law to report these casualties, and it was made the duty of the county auditor, through his assessors, to collect these records for the year ending December 31st immediately preceding and to furnish them to the county clerk, who on or before June 1st of each year is required to send them to the Secretary of the State Board of

Heath. This duty though specified by the statute has been sadly neglected by the assessors though the proper blanks have been regularly put into their hands.

So patent is this neglect and failure that the State Convention of County Clerks, held in this city some time since, unanimously declared itself in favor of the repeal of the present law and a return to the old law or such modification of it as will insure correct statistics.

The State, because of the great importance of such statistics, should provide a compensation to those reporting them and then punish those refusing or neglecting to comply with the law. A persistent refusal on the part of such physicians should be regarded under the statute as a proper cause for the revocation of the certificate to practice medicine.

There is presented herewith a tabulated statement of marriages, births, and deaths for the years 1897, 1898, 1899, and 1900. A careful investigation of these figures will prove interesting and suggestive rather than valuable for the purposes of investigation and sanitary conclusions.

It is proper, however, to state that these criticisms do not apply to marriages, as the presumption is, if indeed it is not a fact, that these reports are correct so far as numbers are concerned; and yet many of the data prescribed by this Board are not supplied in these reports. In many instances the returns of marriages to this office are so carelessly transcribed and put together that it is very difficult, as the data in each case run across two pages, to get the item on the second page to correspond with those on the first page. The result is that the name of the groom being on one page and that of the bride on the other it has often been impossible for the Secretary of the State Board of Health to determine what woman was the bride of a given groom on the opposite side. When these returns are sent back for correction there is delay, and the county clerk does not always feel happy over it.

Nearly all the New England states and several others have efficient laws relating to vital statistics and their reports not only do them great honor but they are conclusive as to the facts desired. It is to be earnestly hoped that Iowa may not be behind in this important particular.

The following tables furnish data for the years above stated as well as respecting the number of deaths in the State institutions under the care of the State Board of Control:

VITAL STATISTICS—PART I.

COUNTIES.	BOARD OF HEALTH RECORD.					
	1897.			1898.		
	Marriages.	Births.	Deaths.	Marriages.	Births.	Deaths.
Adair.....	144	168	58	102	304	79
Adams.....	125	117	37	80	144	76
Allamakee.....	159	191	80	123	337	129
Appanoose.....	306	438	165	240	458	139
Audubon.....	100	170	42	97	327	71
Benton.....	255	407	177	184	440	131
Black Hawk.....	325	303	199	253	499	107
Boone.....	276	428	199	253	604	170
Bremer.....	250	246	104	241	310	113
Buchanan.....	223	224	77	182	333	134
Buena Vista.....	168	342	116	100	222	83
Butler.....	174	221	101	149	363	114
Calhoun.....	138	390	79	118	367	74
Carroll.....	192	232	45	150	485	97
Cass.....	180	599	151	177	395	105
Cedar.....	175	262	114	139	377	123
Cerro Gordo.....	250	165	109	159	374	154
Cherokee.....	185	155	36	146	337	75
Chickasaw.....	138	81	151	103	362	95
Clarke.....	165	173	33	107	270	89
Clay.....	132	222	48	94	233	57
Clayton.....	253	174	88	201	560	151
Clinton.....	453	897	398	439	712	258
Crawford.....	294	190	58	31	492	101
Dallas.....	184	264	114	186	409	134
Davis.....	264	276	51	81	310	118
Decatur.....	300	288	75	97	347	117
Delaware.....	162	386	152	149	403	102
Des Moines.....	480	540	425	370	501	467
Dickinson.....	69	130	27	57	178	57
Dubuque.....	468	1,051	626	372	1,509	261
Emmet.....	88	159	30	70	206	39
Fayette.....	274	256	113	305	566	179
Floyd.....	210	224	79	125	265	84
Franklin.....	150	184	67	113	280	75
Fremont.....	180	230	80	176	204	80
Greene.....	148	193	45	159	337	92
Grundy.....	130	190	22	112	299	79
Guthrie.....	165	246	58	128	397	82
Hamilton.....	176	208	51	182	341	103
Hancock.....	110	203	38	70	271	60
Hardin.....	217	556	158	179	373	110
Harrison.....	198	370	105	144	542	125
Henry.....	207	286	194	166	324	215
Howard.....	156	180	62	127	345	88
Humboldt.....	126	107	42	84	324	72
Ia.....	146	354	66	130	305	65
Iowa.....	168	304	109	148	392	138
Jackson.....	205	251	107	203	430	163
Jasper.....	285	246	73	197	314	113
Jefferson.....	168	247	156	138	298	103
Johnson.....	261	174	144	226	345	170
Jones.....	192	161	67	169	341	143
Keokuk.....	171	140	51	264	519	151
Kossuth.....	117	278	47	156	439	84
Lee.....	557	412	432	340	471	287
Linn.....	593	708	362	478	461	300

VITAL STATISTICS—PART I—CONTINUED.

COUNTIES.	BOARD OF HEALTH RECORD.					
	1897.			1898.		
	Marriages.	Births.	Deaths.	Marriages.	Births.	Deaths.
Louisa	133	396	120	104	270	113
Lucas	177	362	78	127	236	86
Lyons	108	103	93	57	335	52
Madison	202	264	72	148	345	144
Mahaska	456	421	294	325	623	170
Marion	239	448	16	199	432	159
Marshall	399	398	334	298	577	207
Mills	204	196	143	134	253	100
Mitchell	150	177	45	127	297	84
Monona	189	450	94	143	277	73
Monroe	150	170	54	178	318	92
Montgomery	195	144	49	186	332	89
Muscatine	342	485	311	237	322	159
O'Brien	180	392	91	124	399	84
Osceola	56	121	21	72	246	52
Page	261	336	144	215	406	170
Palo Alto	120	205	32	94	272	58
Plymouth	170	340	82	154	441	78
Pocahontas	121	248	50	103	327	83
Polk	1,330	740	655	543	898	185
Pottawattamie	540	344	412	628	323	51
Poweshiek	160	223	70	149	338	126
Ringgold	207	241	51	110	296	71
Sac	104	37	20	162	224	70
Scott	552	1,783	965	427	851	601
Shelby	136	271	54	130	396	105
Sioux	212	420	70	164	698	137
Story	258	299	144	236	418	156
Tama	221	315	84	228	399	125
Taylor	198	370	144	175	362	114
Union	235	135	125	198	318	75
Van Buren	222	246	106	152	178	81
Wapello	414	317	403	331	549	181
Warren	200	306	130	174	422	129
Washington	198	242	100	141	371	145
Wayne	202	64	36	186	393	88
Webster	252	318	192	220	532	118
Winnebago	96	174	40	106	316	88
Winnebush	246	417	165	196	542	186
Woodbury	468	404	364	501	775	167
Worth	90	136	54	74	274	60
Wright	147	192	42	148	292	84
Total	23,048	30,102	13,584	18,066	38,455	12,455

VITAL STATISTICS—PART II.

COUNTIES.	1899.			1900.		
	Marriages.	Births.	Deaths.	Marriages.	Births.	Deaths.
Adair.....	117	297	77	141	302	86
Adams.....	116	239	103	135	261	89
Allamakee.....	130	310	124	130	362	164
Appanoose.....	271	517	193	265	435	138
Audubon.....	66	266	77	72	222	71
Benton.....	200	401	123	222	473	138
Black Hawk.....	282	394	173	329	368	121
Boone.....	259	540	149	292	639	138
Bremer.....	144	368	114	196	321	105
Buchanan.....	163	268	131	176	353	152
Buena Vista.....	119	275	57	126	279	90
Butler.....	149	428	134	114	430	128
Calhoun.....	127	324	70	140	400	102
Carroll.....	132	440	108	182	473	108
Cass.....	207	358	115	186	329	107
Cedar.....	118	337	128	146	350	131
Cerro Gordo.....	196	390	88	198	354	107
Cherokee.....	149	323	57	166	347	56
Chickasaw.....	191	267	73	122	254	78
Clarke.....	124	272	104	136	258	107
Clay.....	104	252	44	114	236	71
Clayton.....	201	536	196	233	542	189
Clinton.....	366	679	240	372	644	250
Crawford.....	188	469	146	155	508	158
Dallas.....	201	412	123	222	433	122
Davis.....	142	280	107	157	292	93
Decatur.....	166	361	118	187	363	106
Delaware.....	156	333	126	151	426	167
Des Moines.....	324	541	431	418	537	366
Dickinson.....	70	162	25	59	164	50
Dubuque.....	401	740	433	491	677	222
Emmet.....	75	178	21	88	208	39
Fayette.....	245	493	169	214	445	144
Floyd.....	160	279	113	175	274	74
Franklin.....	130	307	92	129	231	64
Fremont.....	135	320	105	134	307	128
Greene.....	131	282	76	170	283	90
Grundy.....	135	238	59	117	322	169
Guthrie.....	175	302	108	171	364	70
Hamilton.....	199	373	98	135	386	121
Hancock.....	105	250	55	107	260	67
Hardin.....	207	398	121	204	397	128
Harrison.....	221	469	184	206	468	172
Henry.....	174	346	276	200	324	257
Howard.....	115	311	98	112	255	55
Humboldt.....	93	198	53	91	235	70
Ia.....	88	232	55	88	259	63
Iowa.....	166	413	143	174	427	133
Jackson.....	197	406	142	188	394	150
Jasper.....	223	462	151	272	489	143
Jefferson.....	175	359	157	163	304	122
Johnson.....	213	443	271	193	494	277
Jones.....	178	294	120	168	324	121
Keokuk.....	221	491	153	225	493	147
Kossuth.....	139	443	87	215	594	117
Lee.....	374	417	295	369	430	253
Linn.....	498	753	274	539	632	234

VITAL STATISTICS—PART II—CONTINUED.

COUNTIES.	1899.			1900.		
	Marriages.	Births.	Deaths.	Marriages.	Births.	Deaths.
Louisa.. .. .	106	286	137	95	252	107
Lucas.. .. .	166	224	64	171	240	58
Lyon.. .. .	71	315	62	92	319	54
Madison.. .. .	160	342	144	155	309	95
Mahaska.. .. .	338	569	199	374	590	173
Marion.. .. .	217	415	210	230	495	202
Marshall.. .. .	266	522	217	341	587	183
Mills.. .. .	134	284	166	147	297	131
Mitchell.. .. .	126	288	94	99	281	117
Monona.. .. .	140	391	96	166	431	96
Monroe.. .. .	178	278	134	166	380	94
Montgomery.. .. .	166	289	81	186	257	109
Muscataine.. .. .	282	261	134	273	404	189
O'Brien.. .. .	86	374	72	111	379	95
Osceola.. .. .	77	234	39	86	224	42
Page.. .. .	198	394	192	240	415	169
Palo Alto.. .. .	127	271	52	115	229	59
Plymouth.. .. .	143	474	43	162	503	113
Pocahontas.. .. .	115	326	64	141	344	79
Polk.. .. .	936	1,182	384	1,017	741	195
Pottawattamie.. .. .	93	309	77	102	281	91
Poweshiek.. .. .	132	346	154	156	308	142
Ringgold.. .. .	130	342	89	125	280	78
Sac.. .. .	141	338	78	149	286	92
Scott.. .. .	525	852	628	567	882	607
Shelby.. .. .	145	413	89	131	400	106
Sioux.. .. .	180	644	131	154	624	140
Story.. .. .	188	578	149	217	395	139
Tama.. .. .	184	356	71	205	348	88
Taylor.. .. .	154	290	106	168	307	88
Union.. .. .	177	298	85	182	296	83
Van Buren.. .. .	149	328	149	140	304	142
Wapello.. .. .	353	503	188	357	542	240
Warren.. .. .	152	360	109	163	296	107
Washington.. .. .	172	329	160	163	362	156
Wayne.. .. .	174	317	95	173	369	125
Webster.. .. .	218	495	133	225	552	133
Winnebago.. .. .	95	287	80	86	282	74
Winnebiek.. .. .	186	492	212	178	504	214
Woodbury.. .. .	536	833	217	586	1,007	244
Worth.. .. .	70	230	67	100	264	74
Wright.. .. .	153	302	59	217	257	60
Total .. .	14,224	39,397	13,387	19,175	48,465	12,890

DEATHS OCCURRING IN STATE INSTITUTIONS UNDER THE BOARD OF CONTROL FOR THE BIENNIAL PERIOD ENDING JUNE 30, 1901.*

INSTITUTION.	Average daily population.	Male.	Female.	Total.
Soldiers' Orphans' Home, Davenport.....	447.5	.....	1	1
Soldiers' Home, Marshalltown.....	591	49	7	56
College for the Blind, Vinton.....	137.2	.....	.....	.....
School for the Deaf, Council Bluffs.....	264.7	.....	.....	.....
Hospital for the Insane, Mt. Pleasant.....	943	124	78	202
Hospital for the Insane, Independence.....	1,030	137	86	223
Hospital for the Insane, Clarinda.....	907	98	54	152
Home for Feeble-Minded Children, Glenwood.....	866	33	30	62
Industrial School for Boys, Eldora.....	465.8	3	..	3
Industrial School for Girls, Mitchellville.....	153.7	.....	2	2
Penitentiary, Fort Madison.....	477	85	.....	5
Penitentiary, Anamosa.....	481	.....	..	8
Total.....	.....	456	258	714

* Data kindly furnished by the honorable Board of Control.—SECRETARY.

VIII

MUNICIPAL SANITARY ENGINEERING

BY CHARLES FRANCIS, DANENPORT, CIVIL ENGINEER, IOWA STATE
BOARD OF HEALTH

The need of sanitary engineering in this great section of our country, which we know as the middle west, is evidenced in many ways: So many in fact, that it would be futile to attempt enumeration, so that but a few of the most pronounced will be discussed here.

The immediate purpose of this paper is to call attention to the fact that the people—the public—the masses—whatever their name may be—are very indifferent to, if not profoundly ignorant of, the fundamental principles of sanitary science, and many of the primary rules of hygiene.

Moreover, this indifference or ignorance is by no means confined to that large class of people who work with their hands, who have neither time nor inclination to think upon these things, and for whom the consideration of these matters is naturally (and rightly also) left to others.

This same carelessness in sanitary matters obtains very largely in what is called "the better class"—those who have rather more money, and are supposed to work with their brains—who appear to be so fully occupied with business (which has come to mean merely the chase for the dollar) that they have no time to get acquainted with themselves or their environment.

Great statesmen have told us that this is a government of the people, by the people and for the people. In all the great crises through which our nation has passed, it has been the voice of the people that has shaped our course. The people, then, having such a heavy responsibility, should use every means to enlighten themselves in every direction, as far as possible, so as to be able to govern well.

Then political education is looked after very sharply. During political campaigns, those political leaders supposed to be best acquainted with great national questions, go about explaining why this or that policy should be adopted, and vast quantities of "campaign literature" are circulated so that this great factor in our national safety and welfare "the voice of the people", may be intelligently declared.

Large sums of money are expended—campaign funds; and nothing is left undone to educate the people as to the policy which they should adopt to insure their prosperity and happiness.

Now the question arises, and it appears to be a reasonable one:—Why should this careful education of the people, and training of public thought be confined to politics; Why should not such vital questions as Public

Health, Municipal Sanitation, and other like matters affecting the people quite as closely as politics receive similar attention?

These are plain questions and demand a plain answer, and we do not have to go very far to find it. It is this: There is no money in it. On the contrary, the study of these matters only discloses the fact that proper Sanitary methods are expensive, which means increased taxation, and "we are taxed enough now, goodness knows."

If the people would only treat these great questions relating to public health, as they do the public schools—and they are undoubtedly of equal importance—it would only be a short time before our sanitary systems would be in true scientific line, and we should all understand them and take the interest in them that they deserve.

The first rule of health is **KEEP CLEAN**; ourselves, our clothing, our dwellings, premises, barns, stables, alleys, and all that we have to do with. Everybody knows this, and most of the people live up to it.

When a community can afford it, a system of water supply is introduced. This necessitates a system of sewerage, by which the sewage is removed from the residences, etc., in the community. This sewerage system is carefully worked out by the engineer, who calculates with great pains, the proper dimensions of the sewers and their grades, so that they will all fit together and form a "sewerage system," and so far everything is done in true scientific fashion.

But how many people have given a thought as to what shall be finally done with the sewage collected by this carefully prepared system, except that it shall be discharged into the neighboring stream *below town*?

If there be a stream near town there is no question as to the feasibility of constructing a system of sewerage; if there be no stream near by, it is very doubtful if a sewerage system is built, in fact it may be set down as a moral certainty that it will not be built, because there is no place to discharge the sewage. The stream is necessary to carry away the sewage. Never mind about the people living on the streams lower down, "let them take care of themselves, our sewage is carried away from us."

It seems necessary to state, in view of the almost universal custom (perhaps better to omit the almost) that attains in Iowa of discharging sewers into streams, that this method of disposing of sewage is wholly wrong and as it is entirely unnecessary in this section; it is very nearly criminal.

To show this, we have only to take one Iowa city and its sanitary methods as an example.

The city of Davenport, on the Mississippi river, has about 40,000 inhabitants, with a most excellent water supply taken from the river, and a very fair system of sewerage.

The sewage collected by this system is discharged into the river at various points on the water front, and the garbage is collected in the most approved form of iron carts, and dumped into the river by a very efficient dump boat.

These are the sanitary methods of all the cities or communities in Iowa where there is a systematic water supply and sewerage, systematic or sporadic, if the word may be permitted.

In general it may be said, that for the river cities, there is and can be no other source of water supply than the rivers upon which they are situated. It would seem to be reasonable to say the least that these cities should endeavor

to keep their sources of water supply as clean and free from pollution as possible.

There are quite enough of what we may call natural pollutions of rivers (which call for considerable attention in the way of settling basins and filters) without pouring our sewage into them.

Sewage may be disposed of in a natural and proper manner without injury or cause of complaint to our neighbors, and our water sources preserved against pollution out here in the west with but comparatively small cost, if it be done *now*.

Every year of delay increases the cost by a large percentage, and we are very imprudent, unbusiness like, not to say criminally foolish, to wait for the time (which is as sure to come as the sunrise) when we shall, by federal and state laws, be compelled to keep our sewage out of any stream or water course which may be used as a source of water supply.

Continuing our illustration, suppose that the city of Davenport should acquire 120 acres of land as near the river as might be. Let. we will say, sixty acres of this area be, by grading and tiling, converted into great filters, say eight of them of seven and one-half acres each, this would give each filter one day's work and seven days rest.

Now, this filtering area of sixty acres would dispose of and purify completely the sewage of 60,000 people for an indefinite time.

The effluent from these filter beds would be very nearly perfectly pure water, better and safer to drink than that now furnished and used in most cities, and no harm is done to anybody.

The other sixty acres should be held until the growth of the city demands their services, or in the mean time, might be used as a sewage farm, that is a farm or kitchen garden irrigated by sewage—a most profitable form of horticulture. The sale of the products of the great sewage farms near Berlin in Prussia, brings revenue enough to pay all the expenses of the maintainance of their great system (which includes eleven pumping stations in the city), the interest on the cost of construction, and the annual contribution to the sinking fund.

A scheme of sewage disposal, of this sort is perfectly feasible for Davenport, and in fact for all our Iowa cities. Land, suitable for such purposes, is to be had near every one of them and it is not too expensive now, and in view of the fact that this system, which is known as "Intermittent downward filtration," is one of the best known methods of sewage disposal it is very strange indeed that it has not been adopted here.

Moreover if Davenport disposed of her sewage in this way, she would be in a position to *demand* that the cities above her on the Mississippi river should cease from polluting her water supply with their sewage.

If the city of St. Louis employed this system of disposing of her sewage, her case against Chicago would be immensely strengthened. As it is, she has no case because she is doing to the cities below her on the river, just what Chicago is doing to her.

Some of the details of construction of the large filters mentioned above and also the discussion of the question of the reduction of garbage will be the subject of a future paper.

IX

MODES OF INFECTION AND NOTES ON DISINFECTION

BY ELI GRIMES, M. D., DES MOINES, BACTERIOLOGIST STATE BOARD OF HEALTH

How the cause of disease gets into the human body is a most important question. If we knew the means by which the various disease producing agencies enter the body we could to a great extent prevent disease. We will not enter into a technical discussion of this question, but note briefly some of the simple facts that experiment and observation have demonstrated.

Let us notice first that all diseases are of external origin, that is, due to some cause taken or acting from without. This is very apparent in such diseases as smallpox, scarlet-fever, measles, etc.; as after an exposure to the disease a definite time elapses and the disease appears. In many diseases such as typhoid fever or malaria the conditions are more obscure owing to the remoteness of the cause, but that they are of external origin there is no doubt. While it is evident that all infectious diseases are of external origin, the non-contagious likewise depend on conditions outside the body for their conception. Even the so-called hereditary diseases owe their origin to injurious circumstances under which the body or its parent, usually both, is placed. It is a physiological impossibility for the healthy body to become diseased, except from extrinsic causes.

In order to understand clearly the way by which diseases are contracted we must understand something of disease producing agents. Among the known causes of disease bacteria are the most important. The great diseases, *tuberculosis*, *typhoid fever*, *cholera*, *bubonic pest*, *diphtheria*, and many others are due to bacteria, while malaria in all its forms is due to an organism which belongs to the animal kingdom. Bacteria are vegetable and are classed with the lowest and simplest forms of plant growth. The laity and popular press regard bacteria as animal life, this is false, for in all their manifestations they are distinctly vegetable.

The distribution of bacteria, their dissemination, and constant presence are peculiarities due to their size. They take rank as the smallest thing that lives. To say that a certain bacterium is one twenty-five thousandth of an inch in diameter conveys no definite idea of actual size. Many are but one-half this size, *i. e.* one-fifty thousandth of an inch in diameter. If we reduce this to terms of comparison we find very astonishing results. A box one cubic inch in capacity would hold 125,000,000,000,000 of the smaller bacteria, which if placed side by side like beads on a string would make a

line nearly 2,000,000 miles long. It is evident that in both size and number figures fail to convey an adequate idea.

The rapidity with which these bodies multiply is as wonderful as their size. Some bacteria reproduce by spores, but they all multiply by segmentation, *i. e.* direct division. When a bacterium is living under favorable conditions it divides unto two or more segments, each piece or segment rapidly reaching an adult size and dividing as the parent did. This goes on very rapidly, often less than twenty minutes being required for segments to obtain full size and divide. Here again we find numbers difficult to express and beyond comprehension. Beginning with but a single germ the possible number in twenty-four hours is very great. Even in ten hours the number is more than 200,000,000,000. This explains the rapid course that many infectious diseases run. Bacteria are to be found almost everywhere, in the soil and water, floating in the air, and clinging to our clothes. Foods of various kinds unless recently heated contain great numbers. Processes of decay and decomposition are all due to bacterial growth.

Just why disease is produced by some bacteria while others are harmless can be explained by comparing them with higher plants. Of the hundreds of varieties of bacteria there are but few that are disease producers. In other words there are but few that are poisonous.

Of the great variety of green flowering plants there are but few that are poisonous. The poppy, night-shade, stramonium, and some other plants are harmful because of certain chemical compounds contained in their substance, as morphine, atropine, etc. The bacteria that produce disease do so in virtue of certain chemical compounds they form while growing. The action of bacteria is in all cases that of a poison and not that of a mechanical agent.

By keeping in mind their minute size, their rapidity of multiplication, and the way in which they injure the body we can better understand the conditions that favor the outset of the various diseases.

Besides the active bacterial cause of disease there must be at the same time a predisposing condition present in the individual or else the bacteria will have no effect. We cannot here enter into a discussion of personal hygiene. Here is where the battle with disease is fought, and here the right care of the human body yields its reward.

Disease germs enter the body through different channels; the air passages being the commonest route. The bacteria floating as particles of dust in the air are inhaled and lodge in nose, throat, bronchi, or lung tissue, and if at the place of lodgment the tissue is not sufficiently resistant infection takes place, which infection may be either local or systemic. The diseases most frequently contracted this way are *influenza*, *diphtheria*, *small-pox*, *bronchitis*, *pneumonia*, *whooping-cough*, *tuberculosis*, *scarlet fever*, and *measles*.

The next most important avenue of infection is by the mouth and stomach. Food and drink often contain pathogenic bacteria which when taken into the gastro-intestinal canal invade the body. Water is much more dangerous than food as a carrier of disease. The diseases that find their way into the body by way of food or drink are typhoid fever, cholera-morbus, *diarrhoea*, *tuberculosis*, *cholera*, and other diseases of the intestine and stomach.

The eye often serves as a part by which germs are introduced into the body. When this is the case the disease is one that might be contracted by inhalation. The tonsils when large often catch bacteria and pass them into the body. These diseases are those that might be contracted by ingestion or inhalation.

The skin rarely allows the passage of bacteria, perhaps never does unless injured. A very slight injury of the skin permits the gravest infection. The diseases so contracted are septicemia or blood poisoning, erysipelas, boils and carbuncles, tetanus or lock jaw, tuberculosis, leprosy, skin diseases of many kinds, syphilis, and in some cases cancer.

There are certain conditions of the body or its environment that predispose to certain classes of disease. The different seasons of the year bring in different classes of disease, because each season effects the body differently, hence the susceptibility changes from time to time. There are diseases that are peculiar to hot weather, and those peculiar to cold weather. Sunshine, rainfall, drouth, excessive heat or cold, all have their peculiar influence both upon the human body and the germs that are capable of infecting it.

CARRIERS OF DISEASE

Many agents are capable of carrying disease germs from place to place. We must remember that disease germs are not generated out of certain conditions, but must in all cases come from pre-existing germs. The appearance of a disease means that some way the germs have been brought to the susceptible person from some pre-existing case or infected place. The more common ways by which germs are carried are as follows: dirt, water, food and animals of various kinds. The domestic animals often carry the germs in their coat. Pet cats and dogs carry diphtheria. Rats carry bubonic plague. The mosquito and malaria are related almost as cause and effect. In the Orient a flea bite often produces bubonic plague, while with us we often see a carbuncle following the sting of this little animal. Flies carry typhoid fever germs on their feet. Insects as carriers of disease are being carefully studied, with many facts yet to be demonstrated.

NOTES ON DISINFECTION

To disinfect means to destroy harmful bacteria, hence there can be no disinfection where there is no infection.

To destroy or obscure a bad odor is not disinfection.

The most dangerous infection may exist with no odor, while a very foul odor may be harmless.

To burn a few spoonfuls of sulphur on the stove or a shovel of coals has no effect on disease germs. It requires pounds.

To wet a towel with "PLATT'S CHLORIDES" and waft about the room is a delusion and a deoderant, not a disinfectant.

Asafoetida and onion may keep the individual who has an infectious disease out of your house, but they have no effect on the microbes.

The instructions to dust the carpets and air the bedding while the room is being disinfected are bad instructions. Disinfect, then dust and air.

A saucer full of copperas is often used under the sick bed. It does no good.

Everything that goes out of a sick room should be disinfected before it goes. This applies to the doctor and nurse as well as to the soiled linen.

Kill the flies.

Before disinfecting, make the room as nearly air tight as possible.

Don't attempt to disinfect books. Burn them.

Don't trust sulphur gas or formaldehyde gas to penetrate heavy fabric.

Every carpet, rug and bed quilt should be sprinkled with a four per cent. formaldehyde solution and tightly packed away for twenty-four hours. They will then be disinfected. Treat wearing apparel the same way.

Sprinkle the walls, floors and suspended sheets with 40 per cent. formaldehyde, using one-half pound for every 1,000 cubic feet of room space, close the room for a day and it is disinfected.

Formoldehyde is better than sulphur.

Disinfection should be done thoroughly or it is useless.

Disinfection is not to save time and money, but life.

X

THE RELATION OF CHEMISTRY TO PRESENT-DAY SANITATION

BY PROF. S. R. MACY, DES MOINES, CHEMIST TO
STATE BOARD OF HEALTH

In no branch of science has there been greater progress in recent years than in the line of chemistry. It would seem that our present knowledge of chemistry would bring us far more satisfactory results than we are able to realize. One would naturally suppose that a knowledge of the chemical composition of the materials making up a paint and their relation to one-another, thus producing various reactions, would give us in the paints now used an article very much superior to the mixture once used for the same purpose. We hear our painters of to-day talking about the good old "white lead and oil paint." They deplore the fact that the mixtures put upon the market do not stand the weather as well as the oil and lead manufactured by the old process. Whether or not "Distance lends enchantment to the view" and they really forget how long the old mixture did last, or whether their claims are true, I cannot say; but one thing is certain—that a knowledge of chemistry enables unscrupulous individuals to make mixtures that in appearance, taste, and in fact, in many of their characteristics and reactions, so closely resemble the genuine article that they are sold to the public, labeled as though they were pure. On the other hand the analytical chemist is able to detect the difference between these imitations and the article for which they stand.

This brings us to the phase of present-day sanitation that demands a great share of our time and attention, i. e. the investigation of our food products. There is nothing so detrimental to health as certain impure foods and impure air; the latter and sometimes the former resulting from filthy surroundings. One scarcely knows where to begin to discuss the subject, "Relation of Chemistry to Sanitation." Where chemistry leaves off, bacteriology may put in its appearance, or reversing the order, we may have the action of certain bacteria resulting in the formation of chemical products, that are detrimental to public health. Hence it may readily be seen that it is almost impossible to discuss the subject and leave out bacteriology. But this I will not enter into further than to say that many of the chemical changes closely related to sanitary conditions are brought about by the action and development of bacteria.

The subject of pure air being the one uppermost in our minds, will be taken up first. Here, of course, next to the constant supply of pure air for

the healthy as well as the sick, is the ventilation of the sick room. In our houses heated by hot air or steam, this is not so important as in some of our country homes, especially those in which the sick room is not provided with a chimney, enabling the individual to use a stove for heating purposes. Often I have visited the sick room where an attempt was being made to heat the room by the use of an oil or gas stove, and on one occasion, a gasoline stove. Let us for a moment study the conditions. The room was closed, stove sitting on the floor, burning with a pale yellow flame, the ceiling covered with drops of water caused by the condensation of the vapor formed from the combustion of the oil. One may approximate the amount of carbon dioxide in this room by noting the amount of water condensed upon the wall and ceiling, and upon the window panes.

This carbon dioxide will collect in the lower part of the room as fast as it is formed, later passing to the other parts of the room by diffusion, but, inasmuch as there is a constant increase in the quantity, the lower strata will contain a larger per cent. of carbon dioxide. The patient lying on the bed, the nurse, sitting or standing; which gets the purer atmosphere? The nurse. Which should have the purer? The answer is plain.

If you care to verify the statements made, go to some kitchen where the gasoline stove is used. Close the windows and doors tightly. If there are any openings of considerable size around the windows or doors, cork with strips of cloth. It is well for two to be in the room together. Take with you a chair and a lamp, light the lamp and place on kitchen table. Light the burners of the gasoline stove. Do not stir around the room more than you can help. After the gasoline stove has been burning for twenty-five or thirty minutes, take the lamp from the table, lower it slowly toward the floor. You will notice that it will reach a point where the flame will apparently flash above the wick. If you are careful, you can separate them as far as two inches. Raise the lamp and the flame will meet the wick, lower the lamp and the flame will apparently float on the surface of some fluid heavier than the gas that is given off from the hot wick. This heavy gas is carbon dioxide. It has been formed by the union of oxygen of the air in that room with the carbon in the gasoline. At the same time oxygen has been removed from the air to unite with the hydrogen of the gasoline to form water. This water has probably condensed on the walls and furniture or, if the weather is sufficiently warm, and the room warm, it will remain in the air in the form of vapor.

There is an additional danger in the heating of the room where the sick are confined with gasoline oil or gas stoves. As the quantity of oxygen in the air decreases, the combustion is more or less incomplete with the possibility of forming the poisonous carbon monoxide, that will unite with the haemoglobin of the blood and prevent its doing its duty as oxygen carrier for the system.

The question will naturally present itself, if this method of heating a room is so objectionable, and there is no flue, what is your remedy? It is very simple. No doubt the room has windows, at least one. Lower the top sash almost to the bottom, take a sheet of sheet-iron that will fill the space above; place in it, about the center, a hole the size of a stove pipe. Procure a stove and place in the room, fit it with a pipe passing from the stove through this opening to the outside of the building. You may support an

upright section to carry away the smoke by means of wire attached to the house and from the pipe to a stake driven in the ground some distance from the house, thus forming a triangle support which is very effective. I cannot conceive of a room that cannot be heated and well ventilated in this manner. Here, it is true, we have combustion in the stove which produces the carbon dioxide, but that passes out of the stove pipe, while the hot surface of the stove heats the air in the room by what is known as convection and radiation without decreasing the quantity of oxygen or increasing the quantity of carbon dioxide. Then, surely, we may say it is simply a knowledge of the chemistry of combustion that enables us to point out and remedy these defects.

Next in importance to the subject of pure air is that of pure water. Owing to the pollution of our rivers by the sewage of towns and cities, the water question is becoming one of great importance, not only to our towns and cities, but to our country homes. It is a well-known fact that running water purifies itself by the oxidation of organic matter therein; but, if this organic matter is unduly increased in quantity, the purification is less rapid and the water supply is to a greater or less extent polluted. The disposal of our sewage is a matter of great importance in order that we may have clean, pure rivers and lakes. The disposal of this sewage depends upon the chemical changes and the action of bacteria. The latter we will leave out of consideration. Therefore, we must determine the amount of organic matter emptied during any period into the sewers of our city. This is to be measured definitely, calculations made as to the amount of oxygen or other chemical agents that will be necessary to convert it into harmless compounds. Some classes of organic substances are more readily converted into harmless compounds than others. The nature of these organic compounds must be determined by our chemist. He also must point out the form of treatment. This treatment must be easy of application and economical, and yet do the work thoroughly. No doubt some of these organic matters may be so modified and separated from the water that accompanies them, that they may be put to use as a fertilizer. This, while it disposes of objectionable matter thrown into our streams, also enriches the land, and, if it can be carried out without endangering the health of individuals living near the point of distribution, it is to be recommended.

We have many sewage plants in operation, some more or less successful, which are well worth the time and expense of investigation. Many of our so called inland towns and cities are without any sewer facilities. They will do well to investigate these systems, employ competent experts, and make use of them in their own case. I have in mind a little city near an Iowa lake. It is not provided with sewers. The ground is level; it would be hard to get fall to carry the drainage into the lake, and should they do this, they would not only pollute their water supply, but they would render the lake water unfit for its finny inhabitants. Our fish commissioner would do well to take in hand the pollution of our Iowa streams by towns and cities situated along their banks. I am well aware of the fact that every case is met with the statement that it costs too much money, but what is of greater importance to a state like Iowa than the health of its people? And this can be maintained only by improving our sanitary conditions, and especially in our towns and cities.

Next to the public water supply of a town or city is its private wells. At the present time, the State Board of Health is investigating through its chemist a number of wells that furnish water to private families. The analysis of the water from all of these wells shows a questionable condition. The water contains a large amount of chlorine and nitrates, showing that at some time in the past water from a cess pool or something of that nature had percolated through the soil, and saturated it with these materials. This, of course, is objectionable. It is not only objectionable, but in fact dangerous. We are unable to tell how soon more complete openings may be made from that source of pollution to the well and admit large quantities of organic matter, possibly carrying disease germs. Here we bring into use our knowledge of chemistry, first in the analysis of the sample of water from the well, river or lake, an examination of its probable sources, and the interpretation of the analysis, that is the pointing out of the conditions indicated by the analysis. Much may be said concerning the chemistry of our water supply, but let us stop with the statement that a more thorough investigation of the water supply of the state is needed. This should be done under the supervision of our State Board of Health through the local boards. This plan would insure uniformity of action and result in great good to the people of our state.

Chemistry also has to do with our food supply. Many articles are put upon the market that are of inferior character, which are not only inferior but are mixed with foreign substances, that are added for the purpose of adulteration as well as preservation. Preservatives, in general, are objectionable in food materials. There may be individual cases where a limited quantity of certain preservatives at certain times of the year used with special precautions are allowable and even desirable, but this is not often. It is quite probable that in case of preservatives used in milk, that the preservatives not only prevent fermentation or objectionable changes taking place, but they also interfere with the processes of digestion. In fact it is known that many of our preservatives do this. We have some of them that will combine with proteid matter in the milk and form compounds that are very hard to digest.

Passing from the subject of preservatives, we may touch upon the adulteration of spices and ground goods of every character. This field offers a greater opportunity for adulteration than many others, because the goods are ground and may be mixed with foreign substances in such a way that the adulteration cannot easily be detected. This condition of affairs is brought about to a certain extent by the demand of the public for cheap goods. The manufacturer prepares them; they pay their money expecting to get something for nothing. This is the wrong principle. The people of our state should call to their aid the chemist, provide means whereby an extensive investigation of food products sold in our state may be carried on, and enact a law requiring everything to be labeled, showing its true nature. In other words, if an article is made up of fifty per cent. true article and fifty per cent. some foreign material, let the label of the package so state. The law should provide for the punishment of violating it as well as for the detection of fraud. It is true that many things put upon the market may be properly mixed with substances other than the article shown on the label, and the nature of the article improved; for example, I doubt very much if

we would care to use absolutely pure ground mustard on our tables. I will further say, let the label of this package state that it contains a mixture composed of fifty per cent. ground mustard and fifty per cent. flour. In other words, let us tell the truth and pay for it.

The subject of vinegar from a chemical standpoint is one that is worthy of notice. We often hear the claim that the artificial vinegar should not be used because it contains acid. Of course, these statements are made by those only who are without a knowledge of chemistry, for if they understood the fundamental principles of chemistry they would know that all vinegars contain acetic acid. They, however, object to a vinegar made by the fermentation of dilute alcohol being colored and flavored and put upon the market as vinegar. They object seriously, I suppose, because upon evaporation of a sample of the vinegar it fails to give such a residue as would be left upon the evaporation of a sample of our good old cider vinegar. This good old cider vinegar it would be well for us to investigate a little. The best apples, especially those without inhabitants, are neatly picked, placed in barrels and sent to market; those that are partially rotted and wormy are shovelled together into the cider press. The juice of the apples as well as other juices therein go into the cider. Of course, in the cider press, the insoluble portion is strained out and only the soluble portion passes into the cider, and again the process of fermentation, that is the changes of the sugar in the cider to alcohol, and then to acetic acid, causes many changes that will precipitate some of the foreign materials, while others only change in form and become more soluble. Some one may say that the writer is drawing on his imagination. That is true, but so are the parties who would not use artificial vinegar because it contains acid. I know of one state having a law that prohibits the sale of a vinegar that will not show upon evaporation a certain per cent of residue, that, of course, must come from the apple. Let this residue be of whatever nature it may, it is an unnecessary product, and I believe that the condition of affairs which leads to this peculiar prejudice referred to is brought about by the limited knowledge of chemistry, and in many cases a total absence of knowledge of even the fundamental principles of chemistry.

When we come to explore the great field of thought whether theoretical or practical and undertake to find some subject or phase of a subject that is not primarily based on or connected directly with chemistry in some form, we have a very hard task. Then if chemistry is so widely connected with every affair of life, why not make use of it and apply it to the greatest possible extent in the preservation of the public health.

XI

THE GROWTH OF PREVENTIVE MEDICINE *

Mr. President, Ladies and Gentlemen:

This, the semi-centennial meeting of our State Medical Society, marks the beginning of a new and an important era in medicine. The nineteenth century has passed; its record for epoch-making discoveries has not been equalled in all the history of medicine. Its achievements stand out distinct and alone, and will have an important influence on the future of medicine for all time.

Medical science has not only kept step with the scientific progress of the age, but in many important particulars, ranks easily first. From fragment and conjecture a hundred years ago, certain departments of medicine have passed to the stage of completeness and accuracy, and this through the steady advance in scientific knowledge that stands the test of time and experience. Achievements in this department are but "the samples and promise of coming accuracy in all departments."

*Delivered at the Fiftieth Annual Meeting of the Iowa State Medical Society held at Davenport, May 15 to 19, 1901, by the President, Dr. R. E. Conniff, Sioux City, member and late President of the State Board of Health.

Let us glance at some of the more important developments which have taken place in the field of medicine in the past hundred years, and which will serve as illustrations of "that spirit of advancement which is working in and through it all." In an able and interesting paper on this subject, Dr. Jones has very aptly said in substance: The physician a hundred years ago had reason to believe his art to be near perfection; every department seemed to him to have been thoroughly investigated. He called in the experience of the ages; there had been no startling departures from the teachings of the old masters in medicine, and there really seemed to him but little to be done. Prevention, the key note of modern medicine, had not yet been sounded, and we know that he was groping in the dark; that he was beyond the threshold; that he was only clearing the way and preparing a place for the foundation, which is only as yet begun, and upon which the future will raise the superstructure of rational, scientific medicine.

Could the physician of a hundred years ago have comprehended the marvelous advancement in every branch of medicine which you and I have lived to see; could he have dreamed of the possibilities in the labors of a Schwann or a Schleiden in tracing animal or vegetable structures back to their ultimate cellular elements; could he have believed that the micro-organisms, so minute that no microscope then in existence could discover

them, would be known before the dawn of another century to be the cause of much of the pathology of disease; could he have had reason to predict that surgical procedures, then impossible; would become common; that every cavity of the human body would be entered by the surgeon, with safety and without pain, through the benign influence of anesthesia; if it had been suggested that suppuration was not necessary or even desirable in the repair of wounds; that ideal re-generation took place, not through the influence of suppuration, but in spite of it and that laudable pus never had existence, in fact, do you think for a moment that that statement would have been favorably received?

If it had been suggested that cholera, smallpox, diphtheria, yellow fever, tuberculosis, scarlet fever, puerperal fever, and a host of other diseases were clearly preventable, and only had an existence through ignorance and neglect, do you not think that the person making the statement would have been shunned by his colleagues as a heretic and a dreamer?

We are living in a practical age; assertion means little or nothing; what is demanded is demonstration. The aim is not at the ideal, but at the practical; not at the highest development of the few, but at the highest happiness of the greatest number. What is the record of the century in this direction? What has been done to promote happiness, to procure health, or prolong life? What has been done to make man better physically or mentally, or to prevent, arrest, or remove disease and death? These are the questions that have engaged the medical profession and are still the problems with which we must contend.

Preventive medicine is indeed a child of the nineteenth century. "Every discoverer in medicine seems to carry the motto: 'Prophylaxis is the best cure.' The nobler aim and manifest destiny of a farsighted prevention become necessarily dominant ideals."

It would be a labor of love, and a very pleasant task indeed to go into some detail over the lives and labors of the leaders in medicine of the last century. They did much for their time, and for all time. They held an important place in the history of that great century, to whose influence and glory they so materially contributed. Someone has said, "other vocations have given us many fine examples of bravery and sacrifice, but pestilence and disease have bred many quiet heroes" who go about their work simply, fearlessly, devotedly. No words of eulogy may have been spoken over their remains, "no granite shaft may mark their resting place," but the poor, the suffering, and the unfortunate in all coming ages, will call their names blessed.

The limits of this address will permit me to mention but a few of the many facts which indicate the splendid achievements along these lines.

At the beginning of the last century, the average duration of human life in England was twenty-seven years; it is now something over forty-five. The death rate in the city of London has been reduced from fifty to eighteen per thousand. The individual longevity of man has been increased more than three years; that of woman more than three and one-half years. The general mortality has been reduced in fifty years more than one-half. Dr. Parker estimates that deaths from smallpox have diminished ninety-five per cent; deaths from fevers generally, eighty-two per cent; deaths from typhoid fever, sixty per cent; from scarlet fever, eighty-one per cent; from diph-

theria, fifty-nine per cent; and deaths from tubercular disease, forty-six per cent. The mortality from surgical operations has been reduced twenty per cent. One surgical procedure alone, ovariectomy, has added forty thousand years of useful life to the women of England, with a like proportion for other countries. Has humanity then no debt of gratitude to the medical profession?

Mr. Chadwick tells us that the death rate in the English army forty years ago was twenty per thousand; it is now less than six; in Germany it is six; in France, ten; in Italy, eleven, and in Russia, eighteen. In the Indian army, in 1858, the death rate was sixty-nine per thousand; in 1888, it was reduced to fourteen.

In the cholera epidemic in 1831-3, in Europe and America, deaths were numbered by the millions. In 1893, the nature of the disease was understood; medical science had robbed it of its terrors. In Europe, the deaths resulting were comparatively few, and in our country it was completely shut out, not even getting a foothold in our seaboard cities. Smallpox, which a hundred years ago claimed hundreds of thousands annually, is now almost entirely under control, and would be completely eradicated were it not for the opposition and indifference to preventive measures by members of our own profession.

An eminent sanitary authority has said, we can perhaps find no better evidence of the efficacy of preventive measures than in the history of yellow fever in our southern states. Fifty years there was throughout the South a most appalling condition prevailing. The city of New Orleans was in great danger of being depopulated. In thirty days there were over five thousand deaths from yellow fever alone. The enforcement of sanitary regulations, inaugurated in 1863, was a most fortunate circumstance in that fair city. It not only checked the ravages of yellow fever, but it did much to prevent other epidemics, and to awaken the people to the establishment of a magnificent system of sewerage and the adoption of other sanitary regulations.

Contrast the condition of the present magnificent city of Memphis with that of 1878, when, out of a population of 19,500 persons, unable to get away, there were 17,600 cases of yellow fever, with a death rate of over thirty-three per cent. No such awful example of filth inviting disease has ever before occurred on our continent, nor will it ever occur again. Through the influence of preventive medicine these scourges have all but disappeared, and no longer terrorize our people, and in the growing light we feel the dawning of a better day, when not only they, but tuberculosis, and our common forms of fever, all of which are preventable, will have disappeared. "Every day sees the sentiment growing stronger among all classes of our people. Every day is marked by a distinct advance in public interest. The stagnant cess-pool has given way to ventilated drain; the reeking well and foul cistern to a well regulated public water supply."

Preventive medicine is steadily gaining ground; medical men everywhere are awakening to the realization of their own responsibility. Governor Shaw has very forcibly illustrated the thought by a comparison between the great engines which move our modern trains and the locomotive engines of fifty years ago. In a word, as our opportunities increase, so do our responsibilities.

It is plain, the medicine in the future will be in the main, preventive,

and there is a great responsibility resting upon us as a profession, for as we become acquainted with the conditions which produce disease, our responsibility increases in directing our efforts toward their eradication, and fortifying against the encroachments of disease by building up resistance.

A distinguished authority has said this is a problem involving a campaign of popular education; certain unfortunates must have the help of the State in providing treatment in sanatoria.

Private philanthropy is by no means adequate to so great a problem, but efforts in this direction must be supplemented by municipal, state, and national support.

One of our great dailies recently said: "Our country is becoming enormously wealthy; public resources are unstinted, and there is no apology for distress or want anywhere. Out of the various methods which are proposed for a more even distribution of material blessings, may it not be expected that a system may be evolved by which decent and kindly care will be bestowed upon those requiring it without the thought that they are receiving anything to which they are not justly entitled."

But sentiment and humanitarian considerations should not alone influence the state in dealing with this question. A broader view of the subject must be taken. We must regard it as a matter of the wisest and best policy on the part of the state or community, acting in and for its own best interests. Perhaps no field at the present time is so inviting and "ripe for the harvest" as the question of tuberculosis. Its insidious beginning, its slow and weary course, under ordinary conditions, its sad termination, present a picture only too familiar to us all. Specific after specific, "cure" after "cure" have been proposed, and have vanished in an elixir dream. Climate, which at one time gave such bright promise, has been disappointing, and we find it has but a mild influence on the disease. Patients compelled to live out-of-doors show as large per cent of recoveries in low as is claimed in high altitudes. Two factors, and only two factors, seem to govern its control. Its inception depends on the passage of a living micro-organism from one body to another, and then finding favorable conditions for growth and multiplication.

Hygienic-dietetic treatment in sanatoria, both in Europe and America, emphasizes the fact that tubercular disease is both preventable and curable. In treating it let us keep these facts in mind—that it is both preventable and curable no longer admits of doubt.—The consensus of opinion from every quarter accentuates the fact.

Dr. Stewart, in an admirable paper on this subject, says: "In place of despair and the calm resignation of helplessness with which the consumptive has heretofore been treated, we observe growing confidence on the part of the physician in his ability to do something. We hear him speaking words of encouragement and hope inspiring courage and gladness."

Let us glance at practical results in cases so treated. Knott's statistics show absolute cures, fourteen per cent; relative cures fourteen per cent; amelioration, forty-two per cent. The chances of the disease to heal without being discovered are between twenty and twenty-five per cent. Nine per cent of those dying of non-tubercular disease are shown to have had phthisis at some time in their lives. Four thousand consecutive autopsies, conducted by Birch-Hersfeld, show tubercular lesions in forty per cent. Turban's

statistics show that patients treated in the early stages of consumption are relieved, if not cured, in as high as eighty-four percent.

In view of these encouraging facts, is it not our duty to lessen as far as possible the spread of this disease which annually causes more deaths in Iowa, than all other contagious diseases combined? It is not an extravagant estimate to say that two thousand lives in our state have been sacrificed to the fell destroyer since last we met. What are we doing to limit its spread, to protect or cure those who, through somebody's neglect, have fallen victims to this terrible malady? That it is a legitimate function of government to protect its citizens no one will question.

In Iowa we care for our criminals and for our insane, for our feeble-minded and for our incorrigibles, for our destitute and for our afflicted at an enormous cost to the state, and we thank God we can do these things, for surely no one who loves his fellow man could wish it otherwise. And these yet, unfortunate persons whose kindly care is prompted by such noble sentiments of humanity, are not a source of danger to the lives and health of the community in which they live, while the poor victim of tubercular disease is a sower of contagion in every community, and a menace to the lives and health of all with whom he comes in contact.

With a more thorough knowledge by the people of the nature and infectiousness of this disease, and a more active interest by the members of our own profession, who are or ought to be, conservators of health and priests in the temples of Hygiea, the present condition of things cannot long endure. Other commonwealths have taken the step, and the time is ripe in Iowa to inaugurate a movement for the establishment of a state hospital for the care of our tuberculous poor. It is our prerogative as well as our duty, and I want to suggest, if it meets the approval in the society, that a committee composed of one member from each county of the state be appointed on reorganization, to present this matter to the next general assembly and if possible, secure an appropriation for the establishment and maintenance of such an institution.

If this society will but set to work in earnest, I cannot but believe that so noble and philanthropic an enterprise will appeal to the sound judgment, philanthropy and justice of our legislators, and that Iowa will be classed with the states which are endeavoring to throw about their citizens protection from tubercular disease, and to promote health and prosperity within their borders.

Our modern civilization has brought us many new problems to be solved. We are living in closer touch with sections and people in remote parts of the world. New conditions and questions are constantly arising, and we must give them attention, but not to the extent of neglecting the more important and helpful work at our very doors.

The new century "shall proclaim the nobler aim of thought and action," and it perhaps goes without saying, that the medicine of the future will be in the main, preventive. Our attitude along well established lines will remain unchanged. Research in pathological and bacteriological laboratories will continue. Physiology and hygiene will engage the thought of the profession; soundness of body, the importance of local tissue health as a means of resisting the invasion of pathogenic micro-organisms, will receive greater

attention, until every infectious disease, the great death producers of the world, will be eradicated.

The nature and conditions giving rise to malignant disease will probably be understood, and its preventive treatment established as the result of greater pathologic knowledge. Greater perfection in diagnosis, technique and treatment of all pathologic conditions will follow along the lines already mapped out. The serum treatment of all disease will play an important role in the medicine of the future. Means will be devised and stringent laws enacted for the protection of the race against the curse of inherited disease and those physically and mentally unfitted for the marriage relation will not be permitted to propagate their kind.

What the achievements of the new century will be, no man can prophesy. Marvelous things will be accomplished along lines we little dream of now. It is perhaps safe to predict that the great forces of nature will be utilized to serve man's purpose. A broader and deeper culture will be required of the physician. Some things now taught in our schools of medicine will have to be unlearned, and instruction given along lines which have never yet found place in a college curriculum. "More attention will be paid to the quality, not the quantity of the output."

A closer relation between sanitary authorities national, state and local, will be found necessary and desirable, and will greatly facilitate the work of stamping out infectious disease, and improving sanitary conditions.

"The future of science is not in doubt." Medical men will "hew close to the line," ever ready to seek after and to accept truth, no matter how it may disarrange our preconceived ideas of things, nor how many idols we may tumble down in the pursuit.

Many things were accomplished in medicine during the last century which were undreamed of a hundred years ago.

"The new
Shall do
The unknown things, the wondrous deeds
Earth's future needs
Demand;
Its hand
Shall shape the course
Its brain devise
The plan
To win the richest prize that man can win—
The betterment of man."

XII

SANITATION FOR THE FARM *

In presenting this paper I have to say that the title "Sanitation for the Farm" was selected by your secretary.

To go into any detailed consideration of this important subject, at all, would require at least two or three octavo volumes of many pages each.

There are so many things that affect the health of the home, whether in the country or town, and so many things that are peculiar to the country, and that influence for weal or woe the physical condition of the farmer and his family that I shall have to content myself with but the merest suggestions as to desirable sanitary measures, leaving to your discriminating judgment such after consideration and reflection as their seeming importance may warrant.

The ideal of the sanitarian, for a healthy home, is one where there is the nearest approach to pure air, pure water, and pure food. In city life these requisites are difficult, if not impossible to be obtained. Just in proportion as they are denied, in that proportion are those subject to such denial called upon to battle for health.

Health is a normal, physiological condition, and the life forces that the All Wise Creator has planted in every animal and vegetable are ever vigilant to detect and militant to remove whatever tends to impair health or destroy life.

In country life, and in farming as an occupation, we should have, and could have the essentials for healthful living above referred to, viz., pure air, pure water, and pure food. To have the first two there must be pure soil. Soil pollution is the greatest factor, perhaps, in air and water pollution.

One would naturally expect to find in the abodes of our farmers the noblest specimens of robust health—little sickness and long and vigorous life on the part of their inmates. And yet is this so to the extent that might reasonably be expected?

Is it not rather a fact that sickness and insanity are as prevalent in the country as in the city? There are many who deal in statistics and who seem to be careful and conscientious observers who tell us that proportionate to the population there is a much larger per cent. of both sickness and insanity in the country than in the city.

From my own observation as a physician in Iowa extending over forty years I am compelled to state that sickness and accident in the country were far beyond what it should have been had proper sanitary precautions been

*Read before the Iowa State Agricultural Society December 10, 1900, by J. F. Kennedy, A. M. M. D., Secretary State Board of Health.

observed. Indeed! I may say proportionately larger than in the towns in which I lived.

Nor this could not have been accidental. The natural conditions were all in favor of the country and farm life. Faulty methods of living and defeat of nature's health giving and health preserving provisions must have produced these results.

It will be the object of this paper to briefly suggest some of the reasons for the seeming incompatibility of health with country life as exemplified in farm life.

1. The location of the house is too often faulty. Instead of being built on high well drained ground it is too often placed on the hillside or low ground, so as to be near a well that is convenient to a slough, and where the water can be obtained with as little expense as possible.

As a result the soil beneath and immediately around the the house is more or less saturated with water, drainage is imperfect, and the slough or low ground, extending as it generally does to some river or creek bottom, furnishes the means by which miasmatic breezes are carried into the house. In prairie countries the air in the low lands is not only more heavily laden with moisture, but the temperature is several degrees lower, and colds, pneumonia, neuralgia and rheumatism are much more prevalent.

The site of the house should be such as to afford good surface drainage in all directions. Where there can be plenty of sunshine, and a good cellar, and the building should be two stories high so as to afford ample sleeping apartments in the second floor. The rooms should have plenty of light, and facilities for free ventilation, and there should be enough of them to prevent overcrowding. The kitchen and dining room should be conveniently arranged, bright and airy so that the housewife and the daughters who spend so much of their time indoors should labor under as little disadvantage and discouragement as possible.

It too often happens, or used to, that more care, regardless of expense is given to housing and feeding the stock on the farm than to the inmates of the home—esteeming the profits derived from the sale of the stock more desirable than pleasures derived from providing for the comfort, convenience and health of himself his wife and family.

It is pitiable, as well as surprising, to what extent many farmers will deny themselves and their families comforts, to say nothing of the luxuries of life—subject themselves to the dangers of sickness and loss of life in order to lift the mortgage from the home, buy more acres of land, build additional barns or stock up their farms, with the too often delusive hope that there is a good time coming when they can say "Soul, thou hast much goods laid up, eat, drink and be merry."

2. The "well" should be at a point where the surface drainage, so far as possible is from it instead of toward it. It should, if not piped be lined with large tiles, cemented at the joints and should extend far enough above the ground to prevent in the time of heavy thaws or rainfall the entrance of surface water. It should not be nearer than 150 or 500 feet to the privy or feed yards, and should be covered with a good tight platform on cement or water tight curbing. If windlass and buckets are used the frame supporting them should be boarded up and roofed over. As a general thing an open well with buckets and windlass is to be preferred to the closed well

with a pump. The ventilation is helpful, and the agitation and aeration of the water by the ascending and descending buckets improve its quality both as to taste, smell and healthfulness. Water, in a closely covered well in soil contiguous to coal deposits, will generally be dark colored and foul smelling from the sulphur present, and as a steady beverage cannot be healthful; nor is it so good for culinary purposes. The open well greatly improves this water.

3. There should be provisions for getting rid of the kitchen and laundry slops. There is always quite a good deal of kitchen garbage and refuse that can be fed to the hogs and chickens to advantage. The laundry water and dish water laden with alkali as it must be, could be profitably disposed of in the garden or about the trees and shrubbery or could be carried to a distance from the house in the ordinary open-jointed drain tiling. It should be laid below the frost line and might be carried if convenient to some ravine where it would be rapidly evaporated. Indeed, in such a drain but little of it would be carried very far from the house, as the leakage through the open joints soon absorbs all the liquid. This drain should not be near the well and the opening to it, which should be at least twenty feet from the house, should be boxed, with a strong heavy wire bottom with meshes so small as to pass but little of the solid substances that might be in the slops. This boxing should be covered with a good tight fitting lid.

The privy should not be too far from the house and should be made as comfortable as possible. Disease is often contracted by exposure where the outhouse is barn like, and too far away from the residence. The building should be up from the ground two and one-half or three feet and the wall of the rear or one end should be left open so that a box fitting pretty snugly could be shoved in to fill up the space beneath the seat for receiving the discharges. This box could be placed on plank runners, or small heavy wheels so that when full a horse could be hitched to it and it could be removed to the fields for fertilizing purposes. A drop door fixed on hinges should cover the opening in the rear or end when the box is in place.

The earth or ash closet, however, is a much more sanitary device. In its application sufficient dried earth, garden loam or coal ashes, are mixed with the excreta to absorb all foulness, to keep down odor and to prevent putrefaction. Wm. Paul Gerhard, the well known civil engineer, of New York City, speaking of these closets, says: "Such earth closets work quite satisfactorily with but little attention and forms a simple and cleanly substitute for the privy nuisance."

I may say in this connection that the State Board of Health, with the permission of Mr. Gerhard, has republished for free distribution his practical pamphlet upon the "Disposal of Sewage of Isolated Country Houses." There is a fund of information in it that would be appreciated by and helpful to the farmer, looking to the sanitary interest of his home.

Proper attention to the foregoing suggestions as to the house, its location, convenience, facilities for ventilation, etc.; to the well; and to the disposal of slops and sewage should do much to secure pure air and pure water, two of the essentials demanded.

5. The food question is a most important consideration in the sanitation and healthfulness of any home. The farmer can have his choice for his table of all he raises whether animal or vegetable.

Does he always select the best? Is it not often, too often, the case that the best of all he produces goes to the market and the inferior if not the poorest, is regarded as good enough for himself and his family? And then how often even the best food is rendered unpalatable and indigestible by faulty cooking? How few there are on our farms who know anything about the chemistry or philosophy of cooking? As a result there is dyspepsia, lack of assimilation and nutrition, and such lowering of the vital powers that the subjects thereof are especially susceptible to disease, and poorly prepared to withstand protracted illness.

During sickness there is not such isolation and disinfection practiced as will successfully protect the other inmates of the family. In my professional life I have known almost entire families in the country carried off by scarlet fever, diphtheria, or typhoid fever because the well or the milk had become contaminated from lack of proper care of the disposal of the discharges of those first attacked.

There is scarcely anything that is so easily contaminated by the germs of scarlet fever and typhoid fever as milk, and there is no medium in which the germs of these diseases multiply more rapidly and have greater vitality than milk. It would be surprising if you knew what the busy wide awake physician has observed in regard to the production of tuberculosis, especially in children, from the use of milk from tuberculous cows. Raw milk constitutes so large a part of the dietary of the farmer that his family is especially exposed in case this disease exists in any of his milk cattle.

It would pay the farmer to have a clean bill of health for his cattle, not only from an economical and commercial standpoint, but as a safeguard for his family against infectious disease.

6. The labor on the farm is too often unnecessarily and slavish—often out doors from sunrise to sunset, and longer indoors. In this, however, the men have the advantage over the women. With the labor saving machinery now so generally in use the hours of toil should be greatly shortened and thus lessen the labor and worry of the women in the house.

In the matter of clothing it is sufficient to say that it should be such as will afford the greatest comfort and protection in winter and summer. Neuralgia, rheumatism, colds, pneumonia, affections of the kidneys and bowel disorders are often caused by insufficient or too heavy clothing—by the body being suddenly chilled when bathed in perspiration.

Sunstroke is one of the accidents liable to occur but that fortunately may be almost always prevented by avoiding severe labor in the hot sun when the stomach is empty unless there is kept in the hat wet leaves, a wet handkerchief, or something else to protect the head.

Farmers are peculiarly liable to infectious diseases by intervisiting, or by the visits of traveling salesmen and solicitors. It is a very common occurrence to be able to trace smallpox, scarlet fever, diphtheria and other infectious diseases from one place to another by the means above suggested.

Rats, flies and mosquitoes are all convicted carriers of infection, and flies especially are often the cause of wide spread epidemics of typhoid fever.

A lack of social opportunities affects the health of the farmer's family more injuriously than is generally appreciated. The superintendents of our insane hospitals allege that too great proportion of their inmates have come from the farms, especially of the females, and they attrib-

ute the cause to the long hours of labor in the house; to the humdrum life of the farmers' wives; and to the lack of opportunity or of inclination or time to improve opportunities for social recreation. I think, however, this condition is being greatly improved. The grange; the lyceum; the spelling school; the church and Sunday school; the bicycle; the better facilities for getting to town; and the rural postal delivery together with the low price of excellent reading matter all help to a healthier, happier home life on the farm.

My pleasantest home recollections are connected with country life, and many of the most enduring and delightful friendships I have ever made have been among the farmers. I believe that farm life with a residence in the country, where the laws of hygiene are faithfully carried out is not only most noble and natural but most conducive to health and long life, and hence to happiness. I think there are but few men who leave the farm and go to the city but that often and often, however successful they may be in acquiring wealth, sigh for the quiet and rest of the old country home; and I may say here that fewer farmers wives would want to sell out and move to the city if they had more social advantages and less daily and nightly drudgery.

I may say in conclusion as I said earlier in this paper that the requisite of all successful sanitation is pure air, pure food and pure water, together with proper protection against infectious diseases, and a due regards for the moral and social opportunities that drive away dull care. All these can be had more easily in the country than in the town.

XIII

THE HYGIENIC TREATMENT OF TUBERCULOSIS

BY J. F. KENNEDY, A. M., M. D., DES MOINES

SECRETARY OF THE IOWA BOARD OF HEALTH

As far back as the days of Moses a sanitary code was promulgated that to the Israelites had all the authority of a divine utterance. Many provisions in that code were fully abreast of the most advanced thought of the ablest sanitarians of today—as practical protective measures.

We find that in leprosy, for instance, not only lepers themselves were regarded as the means of extending the disease, but that their clothing, and their residences, if incapable of being successfully disinfected, were to be destroyed.

The fact was fully recognized that the walls, and even the foundations of the houses of lepers became so infected as to be sources of spreading the disease, and under specified conditions were regarded as incapable of disinfection, and ordered destroyed, and the debris removed beyond the city or camp.

About one year ago an intelligent gentleman, a merchant living in an Iowa town to which he had recently removed, purchased a residence property for a home for himself and family. After doing so he was informed of some facts that produced a great deal of anxiety, and he wrote to me as Secretary of the State Board of Health for advice. The facts as stated were that of three families who had previously lived in the house in succession, each family had lost one or more members with pulmonary consumption. Of the last family four members had died of this dread disease.

He wrote that the house was in every way desirable, and yet with such a history he hesitated, and justly, too, to move his family into it.

The mere fact of such an inquiry demonstrates that the laity as well as the profession is coming to look upon the "great white plague" as an infectious disease; and that its appearance in any individual is a result not so much of heredity as of infection and environment.

Consumption is essentially a house, or indoor, disease. Perhaps I ought not to say "essentially," and yet the expression is not far from the truth. I would not have you think that a residence in a comfortable, well ventilated house is in itself a source of danger because of its liability to produce tuberculosis. The danger lies in the fact that the bacillus of tuberculosis which has become omnipresent finds more congenial and favorable conditions for its multiplication, duration of vitality, and for its destructive life processes in dwellings than out of doors.

There is much in the selection of a building site, so as at all times to secure good ventilation, plenty of sunshine, and freedom from dampness. A house destitute of these hygienic conditions that has once become the abode of the tubercle bacillus is indeed a constant menace to its occupants—a menace that grows and strengthens with the increasing years.

The following interesting history of a house in Ohio was furnished Dr. C. O. Probst of Columbus, the secretary of the Ohio state board of health, by Dr. J. E. Gaston of Mineral Ridge: "This house was constructed about 1830, and was occupied by a family of the name of F. It is related that a young man who lived with the family was 'always ailing and in delicate health,' but the only death was that of a baby with bowel trouble. They resided on the premises until about 1846, when the house was occupied by another family. They were an unusually strong and healthy family when they first came to this place, with no previous tubercular history. The first one connected with the family to pass away was a lady boarder, but information does not reveal the cause of her death. It was quickly followed, however, by the death of two sons, two daughters, father and mother, from tuberculosis, leaving only one son, who had previously gone to Illinois on account of his health, and who still survives. From 1879 until now the house has been held by the present occupants. There is no history whatever of consumption in the family prior to their coming to this house. The daughter who died recently was born there. Her death was the seventh in the family in as many years from pulmonary tuberculosis. A sister, two brothers and a mother survive, but the characteristic traces of the disease are plainly visible in the faces of one brother and the surviving sister. The building is a story and a half high and is surrounded by dense foliage." The doctor further says that the residents of this place look upon the house with horror, and if the family were to move out the building would go up in flames inside of twenty-four hours, and not a hand would be turned to save it.

The lesson I would teach from the foregoing is that when tuberculosis appears in successive families in the same house it is pertinent to inquire whether health authorities and citizens generally should not insist that it be if possible successfully disinfected, or else completely destroyed, for the public good.

The same inquiry perhaps would be pertinent in the case of some other infectious diseases. Only a few weeks ago I received a letter from Cumberland, Cass county, informing me of a severe outbreak of scarlet fever in a certain house. Some months before a party who resided in the house had in his family several cases of scarlet fever. Soon after he removed to Colorado—perhaps without the house being properly disinfected, if at all. Within ten days or two weeks after another family had moved in and several members also came down with the disease in a malignant form.

The design of this paper is not only to emphasize the dangers of insanitary dwellings, but to magnify if possible, the advantages of fresh air, outdoor life, chest expansion, and such athletic and other muscular exercises as will best secure and maintain the most perfect respiration; and this for the purpose of the treatment as well as of the prevention of tuberculosis.

I do not underrate nor minimize the great importance of disinfection, or destruction of the sputa and other excreta of consumptive patients, nor the

beneficial effects of proper therapeutic measures. These measures are highly essential and hence are heartily commended, as are also all efforts to secure milk and other articles of food that have no taint of tuberculosis.

Whatever undermines the general health increases the susceptibility to the infection, and diminishes the power of recovery from incipient or advanced tuberculosis. The highest condition of health and resistful vitality is best promoted by the habitual breathing of pure air. I believe the greatest enemy to the bacillus tuberculosis is an abundance of oxygen, as found in pure, fresh air.

The open air treatment of consumptives and of those threatened with tuberculosis disease, has, when systematically carried out, given better results than any other. In Germany, and to some extent in this country, the systematic treatment of those believed to be predisposed, and of those afflicted with tuberculosis in various stages, is resorted to in "sanitoria," with the most encouraging results. In these resorts the inmates have the advantage of a regular life, nutritious food, such exercise and chest distention as they can bear, and above all, an abundance of fresh air. Even in the coldest winter weather patients, after gradual habituation, pass the whole day walking in the open air, or sitting or lying on resting places comfortably wrapped in blankets. No claim is made for the advantage of climate—the all-important thing being an abundance of pure air.

Dr. Hambleton, of London, England, in his recent work on "The Suppression of Consumption," makes this bold proposition, and produces an array of evidence in support of it:

"Consumption is the direct result of the reduction of the breathing surface of the lungs below a certain point, in proportion to the remainder of the body, and is solely produced by conditions that tend to reduce the breathing capacity of the lungs." He says further: "I have experimentally produced consumption by these conditions. On one occasion I took a well developed chest and gradually submitted it to conditions that tend to reduce the breathing capacity, and at the same time as far as possible, placed impediments to the performance of compensatory action by other organs. At first there was a reduction of the chest girth, a wasting of the muscles, a loss of the range of extension, the well-known change in shape, and increased frequency of breathing. This was soon associated with catarrh, pain in the chest, steady loss of weight, and hectic; and the process was continued until I was satisfied that consumption was well established. Then I induced compensatory action by other organs, and submitted the lungs to conditions that tended to develop them. This was followed by great relief in the chest symptoms, which evidently greatly disappeared, by a restoration of the general health, a return to the normal weight, and a change in the shape of the chest in the opposite direction, and I continued the process till the chest had regained its full development, and there was sound health. Each step in the experiment was carefully verified, the same sequence invariably observed, and I have both traced the presence of conditions, and watched their process in many cases of consumption."

Dr. Hamilton cites various occupations and conditions of life as illustrating his proposition—showing that the worst districts in England were not so productive of consumption as the conditions in the English army. Notwithstanding these men were selected because of their physique, were exam-

ined before being listed, and re-examined in three months, yet an unusually large proportion became consumptive owing to the changed conditions of life, to the impure air of the barracks, and to the compression of the chest by clothing, and by a variety of conditions that tend to reduce the breathing capacity. He cites the fact that many animals that never in their wild and unrestrained conditions develop consumption, die from the disease within a few months or years after being confined—that strong, healthy women, accustomed to work in the fields, go to Paris, put on corsets, restrict their breathing capacity, and furnish the majority of consumptive subjects; that the children of consumptive parents, though born with as well-developed chests as those born of healthy parents, because of the care taken of them to prevent colds by exposure, and because of heavier clothing that interferes with breathing, early develop the disease; that from greater indoor life and greater chest compression the women of our country homes are more liable to consumption than the men.

He speaks of the easy facilities for travel existing today as conducive to consumption, and the reluctance of the people to walking if they can ride, and that by the invention of machinery so much is done now that formerly required muscular exertion. The construction of modern houses—the effort to make them impervious to outside air—creating a hyper-sensitiveness to cold, and preventing us from venturing out more than necessary during the colder winter months—also favors the production of the disease.

The preventive measures recommended by our author are erect carriage of the body; chest expansion by a systematic course of full inspirations; life out-doors as far as possible; the freshest and fullest ventilation of our homes; the discarding of all clothing or occupations that restrict chest expansion; the maintenance, so far as possible, of the highest and most perfect physical vigor by proper food, exercise, cleanliness, etc., having constantly in view, however, in all preventive measures the proposition so emphatically enunciated, "that consumption is the direct result of the reduction of the breathing surface of the lungs below a certain point, in proportion to the remainder of the body, and is solely produced by conditions that tend to reduce the breathing capacity."

He concludes his monogram with fifteen propositions, the last of which is: "That both the experimental and the practical application of measures that tend to compensate for and counteract those conditions have been invariably followed by the arrest and subsequent complete recovery from consumption, where the disease was not too extensive; and the same process has obtained in the thousands of cases of cure by nature, and by Sydenham. * * * Consequently we now have it in our power to secure, with absolute certainty, the prevention of and recovery from consumption."

Dr. Hambleton writes as an enthusiast—perhaps as a faddist—but he refers to more than a score of our most noted medical authors in support of one or more of his propositions. I firmly believe that the preventive and curative measures recommended by him conjointly with the methods of disinfection recommended by the advocates of the germ theory, afford methods of prevention that, if faithfully carried out, will materially reduce the number of cases, and greatly lessen the fatalities of this dreaded "white plague."

Vital statistics furnished by the register general of Great Britain show that the deaths from this disease have, because of more intelligent pre-

ventive and curative methods, been declining in number the last ten years; and Dr. S. W. Abbott of Boston, Secretary of the Massachusetts State Board of Health, makes the same observation as to Massachusetts. He attributed this falling off largely to the extensive use of the bicycle, especially by women.

In order that the best results from this treatment may be witnessed, it is important that the treatment should begin early. Indeed, the treatment should begin before the disease has really stamped its impress upon the subject, and be continued until the chest development and the general health are so improved as to render the subject immune, or until recovery is complete. Chest measurements should be taken and carefully noted, and where the lung capacity is below the normal, persistent and intelligent measures should be adopted and persevered in until the breathing capacity has been brought up to or beyond the normal.

Where practicable, treatment should be in hospitals or sanatoria, located and constructed with the most favorable sanitary conditions, and where the system of chest-development would be intelligently and persistently prosecuted. With a will and determination, however, to get well, no such appliances are essential. The patient at home can by his or her own individual efforts, under the direction of an intelligent physician, successfully combat the disease and regain and maintain excellent health.

I verily believe if the preventive measures above recommended are rigidly and faithfully observed for the next twenty years there will be a most surprising as well as gratifying falling off of cases of tuberculosis, and the methods of treatment recommend will commend themselves to the laity as well as to all schools of medical practice because of the large number of recoveries.

XIV

REPORT OF BRITISH CONGRESS ON TUBERCULOSIS *

So much interest has been manifested in the great Congress on Tuberculosis recently held in England, and so many have expressed a desire to see what was done that the SECRETARY takes great pleasure in republishing the following very excellent report sent by Dr. A. R. Thomas, Passed Assistant Surgeon U. S. M. H. S. to Surgeon General Walter Wyman, and published in *Public Health Reports*, September 6th. The report is a most compact as well as complete summary of the proceedings. This fact is the only apology for republishing it entire:

OFFICE OF MEDICAL OFFICER IN COMMAND,
MARINE-HOSPITAL SERVICE,

London, England

SIR,—I have the honor to make the following report of the British Congress on Tuberculosis, held in this city from July 22, to July 26, 1901, inclusive, and to which I was appointed a delegate:

OPENING OF THE CONGRESS

The congress was opened by a general session on the afternoon of July 22d, the Duke of Cambridge occupying the chair on behalf of his Majesty the King. The delegates and members of the congress were welcomed by the various bodies of the city, and one delegate from each country responded. The further meetings of the congress were divided into four sections, to meet each morning as follows: Section 1, state and municipal; section 2, medical, including climatology and sanatoria; section 3, pathology, including bacteriology; section 4, veterinary. In addition, on each afternoon of the congress, a general meeting was held and an address delivered on some topic of common interest to the whole congress. Various forms of social diversion were provided during the week, including garden parties, receptions, and a dinner to the foreign delegates.

PROFESSOR KOCH'S ADDRESS ON TUBERCULOSIS

The first general meeting on July 23d was addressed by Professor Koch, of Berlin, his subject being, "The fight against tuberculosis in the light

* Though this Congress was held subsequent to the close of the period embraced in this report its importance justifies its insertion herein.— SECRETARY.

of the experience that has been gained in the successful combat of other infectious diseases." He said that since the discovery of the bacillus of tuberculosis it was evident that tuberculosis was a preventable disease, and in combating it as such it would draw valuable lessons from our experience in other pestilences, for we had learned that every disease must be treated individually and measures adopted according to its special nature and etiology. An illustration of this principle is plague, where formerly the patient was considered in the highest degree a center of infection, but now only patients with plague-pneumonia are so regarded, and we know that the chief source of contagion are the rats affected with plague, and effective work could be done in exterminating rats, otherwise the chief etiological factor is not touched. Cholera offers another example, for here the chief propagator of contagion is the water, and so the water is the first thing to be considered. Hydrophobia is also instructive, for while inoculations are curative, they are not preventive of infection, and the only real way of combating this pestilence is by compulsory muzzling. Lastly, leprosy is closely akin to tuberculosis, and like it only spreads from man to man by close contact, so to combat it it is necessary to prevent close communication of the well and sick, and so isolation is adopted.

In by far the majority of cases of tuberculosis the disease has its seat in the lungs, and has also begun there. From this it is justly concluded that the germs of the disease—that is, the tubercle bacilli must have got into the lungs by inhalation. As to the question where the inhaled tubercle bacilli have come from there is also no doubt; on the contrary, we know with certainty that they get into the air with the sputum of consumptive patients. This sputum, especially in advanced cases of the disease, almost always contains tubercle bacilli, sometimes in incredible quantities; by coughing and even speaking, it is flung into the air in little drops—that is, in a moist condition, and can at once infect persons who happen to be near the coughers, but it may also be pulverized when dried in the linen or on the floor, for instance, and get into the air in the form of dust.

The bacilli may get into other organs in the same way, but rarely. Transmission by heredity is extremely rare.

It is generally assumed that another source of infection exists in the transmission of germs from animal to man, but investigations by him have led to a contrary conclusion. Experiments were conducted by feeding tubercular-free young cattle and swine with tuberculous material from bovine and human sources, with the result that from bovine sources the animals became infected, while from human sources they remained free, and the conclusion would seem to be that human tuberculosis differs from bovine and can not be transmitted to cattle. But more important is the question as to whether bovine tuberculosis can be communicated to man, but this is impossible of absolute demonstration. As large quantities of butter and milk are consumed containing bacilli, it would seem that many cases of tuberculosis affections should be caused, but from the examination of a large number of post mortem reports, it was found that primary intestinal tuberculosis was extremely rare even in children in whom it ought to be most common.

"Though the important question whether man is susceptible to bovine tuberculosis at all is not yet absolutely decided, and will not admit of absolute decision today or tomorrow, one is nevertheless already at liberty to say

that if such a susceptibility really exists the infection of human beings is but a very rare occurrence. I should estimate the extent of the infection by the milk and flesh of tuberculous cattle and the butter made of their milk as hardly greater than that of hereditary transmission, and I, therefore, do not deem it advisable to take any measures against it."

The main source of infection in tuberculosis is, therefore, the sputum of patients, and to prevent this infection is our first object. Isolation is impracticable and also unnecessary. If proper precautions are taken no infection need occur, but this is difficult among the poor where there is overcrowding, bad ventilation, and often whole families are thus infected. Therefore, the first indication is to improve the social condition of the poor, and, secondly, to provide consumptive hospitals where patients in the latter stages may obtain treatment gratis, and where the patient would be willing to go. England is the only country having any great number of such institutions, and the diminution of consumption in this country is probably due in a large measure to this reason. Another measure especially valuable is compulsory notification, which not only shows the number of tuberculous persons, but also where they reside, and, therefore, where disinfection and instruction are necessary. Disinfection is of the greatest importance, not only of rooms and houses, but also of infected bedding and clothing. Education of the public is of great benefit, for it has already done much to limit infection.

On the other hand, for treatment, are the sanatoria, which have lately come into vogue, and can cure a certain number in the early stages of the disease. This number is small however, in comparison with the whole number of infected persons, and its value should not be over estimated.

"And now, in conclusion, to glance back once more to what has been done hitherto for the combating of tuberculosis, and forward to what has still to be done, we are at liberty to declare, with a certain satisfaction, that very promising beginnings have already been made. Among these I reckon the consumption hospitals of England, the legal regulations regarding notification in Norway and Saxony, the organization created by Biggs in New York, the sanatoria, and the instruction of the people. All that is necessary is to go on developing these beginnings, to test and, if possible, to increase their influence on the diminution of tuberculosis, and wherever nothing has yet been done to pursue similar measures."

DISCUSSION OF PROFESSOR KOCH'S ADDRESS

It is needless to say that this address has given much ground for discussion throughout the congress. Lord Lister remarked that it would be a serious and grievous thing if it should lead to any relaxation of the efforts being made at present to provide a pure milk supply, and it should turn out that these views of Professor Koch were erroneous. He cited the instance of smallpox and cowpox and stated that while smallpox could not often be inoculated from man to cows, it was possible to inoculate monkeys from man and afterwards cows from the monkeys, and we now know that the two diseases are identical. He further said that he agreed with the speaker that further investigation was desirable. Professors Nocard, Bangs and Sims Woodhead all agreed with Lord Lister.

PROFESSOR BROUARDEL'S ADDRESS

The third general meeting was addressed by Professor Brouardel, of

Paris, on "The measures adopted by different nations for the prevention of consumption." He pointed out the havoc that was caused by this disease and the slowness in recognizing its dangers until its infectiveness was proven by Willemin and Koch. Before this England had recognized the dangers arising from damp and dark dwellings and seventy years ago began the crusade for healthy dwellings. The grounds of prevention in all countries are identical—that is, that tuberculosis is preventable and curable. First comes legislation and the education of public opinion. Pamphlets are issued for the information of the public in England by the National Association for the Prevention of Consumption, and in Germany societies were founded for building sanatoria and popularizing sanitary ideas. Belgium has a national league against tuberculosis. Norway has voted money for the printing of a popular work on tuberculosis. In France they have collected together those who can teach and popular lectures are given, and on every hand societies for the prevention of tuberculosis are springing up. This year 88 lectures on tuberculosis had been given to 12,000 pupils. Thus gradually in all countries the public are beginning to realize that personal care and cleanliness are necessary to obviate contagion, and are also realizing that other idea to my mind equally important, that a consumptive patient is only dangerous if the necessary precautions are not taken around him, and if he himself does not take them to protect his relatives, friends, and fellow-workmen from contagion. The great danger is spitting, and once this disgusting habit has been suppressed, consumption will decrease rapidly. In the United States the habit is against the law, and in Sidney, New South Wales, a fine of £1 is imposed for spitting in the streets. The sputum is not dangerous if put in antiseptic receptacles, or if thrown in dry and well-lighted places it soon loses its dangerous properties; thus, more victims occur in dark and ill-ventilated houses, for here it retains its virulence a long time. Thus the importance of healthy dwellings becomes plain, and is recognized by various countries, notably England, which has several acts dealing with workmen's dwellings, and model dwellings are largely built. In Germany also an effort is being made in this direction. Belgium is also one of the most enthusiastic countries in taking up this subject, but in Denmark building societies have flourished best of all. In France also something has been done in this direction, and all authors agree that mortality is lower in these healthy houses and in the town in which they are built. Bad quarters exist in all towns, which are a hotbed of tuberculosis, and these must be found and demolished. Alcohol is another potent cause of tuberculosis, and it has been shown that the death rate is higher from this disease in the different classes of society in proportion to the amount of alcohol consumed. In scrofulous children and those reared in unhealthy dwellings the duty is to build up the body. for this purpose there are established in France and Italy and other countries, sanatoria at the seaside for such children, with good results. France has 14 such institutions that accommodate more than 2,000 children a year.

Prevention also follows the line of food, and the inspection of meat is in this direction. However, the great danger here is in the private slaughter-houses where no inspection occurs. In milk the danger is in tuberculous mastitis and here the danger can only be recognised by examination of the

udders. In England it is a noticeable fact that while the deaths from tuberculosis have decreased 45 per cent. in the last fifty years the deaths in children have increased 47 per cent., which is attributed to the increase of abdominal tuberculosis due to milk. Strict inspection measures are adopted in Norway, Sweden, and Denmark.

Coming to the curability of tuberculosis, we know it is curable in all stages, but especially in early stages, as is abundantly shown by post-mortem examination and the finding of cicatrices of all sizes in the lungs. For this object come dispensaries where the patient can obtain treatment in the earlier stages and receive instruction regarding measures of hygiene and feeding, and if necessary be sent later to a sanatorium. In Germany there are polyclinics for tuberculosis, in the large towns, where the patient can be treated throughout the illness or till sent to a sanatorium, and a committee connected with it looks after the patient at home, tells his wife what to do, and sees that the house is kept clean, and, as far as possible, relieves the poverty caused by the breadwinner's illness by means of a bank kept for such purposes.

The same idea was first carried out in France by Chalmette, but he went further in going and seeking out the consumptive and inviting him to come to the dispensary, and he has established a dispensary on these lines at Lille, and several others have been founded on similar lines in various parts of France.

Some patients must be sent to sanatoria, and here the principles are rest, moral and physical, stuffing, and the open-air treatment. In Germany this system is carried out most enthusiastically, and there are eighty-three sanatoria opened already or ready to open which can accommodate 12,000 patients each year. They have been built by local insurance, by sickness banks, by the manufacturers who have combined to found sanatoria for their work-people, by parishes which have united for the purpose. There are more of the latter. In some parts a tax of from 1d. a head has been exacted. The state has also founded several sanatoria for its servants. Patients remain three months, and it is thought advisable that they return for a month's treatment the next year. The results seem satisfactory, for from forty-six to sixty per cent of those who leave were able to work. Germany's example has been followed by England, Scotland, Australia, Canada, Austria, and America, also in Russia, Sweden, Denmark, Norway, Italy and the Netherlands sanatoria are building, and in France several sanatoria have been opened. In the United States also, wards are assigned in hospitals for the exclusive use of consumptives. From an international standpoint, it would seem that consumption can not be treated as plague and the other pestilences, but much can be done by disinfection of railroad carriages, steamboats, and hotels. In the United States hotel keepers are obliged to notify the authorities if they receive a consumptive patient, and disinfection of the room so occupied is compulsory. The minister of the interior in Germany has brought in even more stringent measures. Every doctor who attends a case of pulmonary or laryngeal tuberculosis is bound to report it in writing to the police as soon as he has made his diagnosis. After death from tuberculosis the room in which the patient has died has to be disinfected and also his belongings. Hotel proprietors, furnished housekeepers,

asylums, and other public institutions are compelled to notify at once every case of tuberculous disease which arrives in their establishments.

PROFESSOR MCFADYEAN'S ADDRESS

The fourth general meeting was addressed by Prof. John McFadyean, of the Royal Veterinary College, his subject being "Tubercle bacilli in cow's milk as a possible source of tuberculous disease in man." He said that until a few days before he had not thought he would have to argue the question as to the identity of human and bovine tuberculosis, but Professor Koch's address made this necessary. He thought Professor Koch's train of reasoning appeared to be the following:

First. That the bacilli found in cases of bovine tuberculosis were much more virulent for cattle and other domestic quadrupeds than the bacilli found in cases of human tuberculosis.

Second. That this difference was so marked and so constant that it might be relied on as a means of distinguishing bacilli of bovine tuberculosis from those of the human disease, even assuming that the former might occasionally be found as a cause of the disease in man.

Third. That if bovine bacilli were capable of causing the disease in man, there were abundant opportunities for the transference of bacilli from the one species to the other, and cases of primary intestinal tuberculous from the consumption of tuberculosis milk ought to be of common occurrence, but post-mortem examination of human beings proved that cases of primary intestinal tuberculosis were extremely rare in man, and, therefore, it must be concluded that the human subject was immuned against infection with the bovine bacilli, or was so slightly susceptible that it was not necessary to take any steps to counteract the risk of infection in this way.

He thought one of these premises was ill founded and the others had little or no bearing on the subject, and that reasonable ground remained for regarding tuberculous milk as distinctly dangerous to man. He argued that even if bovine bacilli were more virulent to cattle, and that human bacillus has little virulence, the opposite did not follow, and the probability was all the other way, for it was known that those bacteria that were common to all the domesticated animals were also pathogenic to man. As for infection from cattle to man, he quoted the post-mortem records from the hospital for sick children in London and the Royal Hospital for sick children in Edinburgh. Out of 547 cases of tuberculosis, the proportion of primary infection through the intestine was found at the former institution to be 29½ and the latter 28½ per cent. He hence submitted that there was strong *prima facie* evidence that animals were a possible source of human tuberculosis. He thought the diseased cows were only dangerous when the udders were affected, for it was estimated that 30 per cent of the milk cows in England were tuberculous, and only about 2.2 per cent had the udder affected. In the latter class, the milk often contained large quantities of the bacilli and the danger was greater because in the early stage such udders were quite painless and no change showed in the character of the milk. Another source of contamination of milk that could not be lost sight of was dust and dirt. As a remedy, he thought the tuberculin test impracticable, because too expensive and too disturbing to the cattle industries. He, therefore, recommended periodical inspections at brief intervals by compe-

tent inspectors. He supported also the compulsory notification of udder disease and of symptoms of tuberculosis in milked cows and the interdiction of the sale of milk from any animal suffering from tuberculous disease of the udder, or exhibiting clinical signs of tuberculosis.

DR. BIGGS ON "THE NOTIFICATION OF TUBERCULOSIS"

In the section of State and Municipal Dr. Biggs, of New York, presented a paper on "The Notification of Tuberculosis," dealing mainly with New York City, but he also mentioned that notification was also compulsory in Michigan, Buffalo, and Philadelphia. New York was the first to pass such a law in 1893, but the compulsory notification was not complete, physicians in private practice only being invited to notify. Sputum was examined free of charge and at the end of the third year 8,000 specimens per year were examined. Efforts were made to disinfect premises in which death from tuberculosis had occurred. In 1897 it was resolved by the board of health of New York that tuberculosis being a dangerous and contagious disease, every physician should report in writing as to patients suffering from that disease within one week of being called in, and a sum was appropriated for the care of poor tuberculous patients. This resolution was not strictly enforced as regards private patients, but public opinion was gradually decreasing the number of cases not notified. In consequence of these measures and the better treatment of consumptives, there has been a decrease of 30 per cent in mortality arising from tuberculosis.

ALDERMAN MACDOUGALL'S PAPER ON VOLUNTARY NOTIFICATION

Alderman Macdougall, of Manchester, read a paper on the working of the voluntary system of notification in that city. At first it was restricted to institutions, but later, in 1900, private physicians were invited to notify, in order that—first, the assistant medical officers might visit the homes of patients and instruct the household in the precautionary measures to be adopted, leaving with them printed instructions. Second, that the nature of measures of disinfection required might be determined. Third, that they should make inquiries into the exposure to infection of individual cases from relatives, work mates, friends, etc., and into their occupations and places of work, the various houses which they had inhabited, their physique, personal habits, etc. Fourth, that supervision might be maintained over infected households, change of address ascertained, personal precautions and household cleanliness maintained, and necessary measures of disinfection carried out from time to time. Fifth, that it might be ascertained if the required measures of disinfection were being executed. Sixth, that assistance might be given in getting bacteriological examination of sputum in suitable cases. Seventh, that information regarding households might be obtained to serve as a basis for hospital provision.

The number of cases notified from September, 1899, to March 31, 1901, had been 2,338, and of these 1,701 had been in institutions and 638 in private practice. In addition to disinfection and cleansing, notes were made of centers of infection.

Dr. M. Holmboe said that in Norway notification was limited to pulmonary tuberculosis and tuberculosis of the skin and urinary organ that could be positively diagnosed. Deaths from tuberculosis must be reported

and the premises be disinfected. He thought compulsory notification was necessary to give authorities power to enforce sanitary orders. Various other members expressed their opinion, all being in favor of some form of notification, and the following resolution was passed: "That the voluntary notification of cases of phthisis attended with tuberculous expectoration and the increased preventive action which it has rendered practicable has been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which sufficient sanitary ministrations renders it practicable to adopt the consequential measures."

PREVENTION OF TUBERCULOSIS IN CHILDHOOD

Two papers on the prevention of tuberculosis during childhood were presented. One by Dr. Leon Petit of Paris, reporting the establishment of dispensaries for children in that city and the good that had resulted. Dr. Knopf, of New York, read a paper on the State and individual prophylaxis of tuberculosis during childhood, advocating the separation of consumptives and children and the doing away of many habits tending to infect children, such as kissing and the tasting of food.

THE INFLUENCE OF HOUSES AND AGGREGATION

Under the "Influence of houses and aggregation," Dr. Coates, of Manchester, reported experiments made with dust from various localities. In twenty-three specimens taken from dirty and infected houses, sixty-six per cent proved infective. In ten clean but infected houses fifty per cent proved infective, and from the waiting room of a large consumptive hospital and a large general hospital the results were negative, but specimens from a railroad waiting room gave positive results in two cases. For disinfection he recommended the use of a solution of chlorinated lime, one and one-half ounces to a gallon. Walls, ceilings and floors, and all suitable articles of furniture were to be thoroughly washed with this several times. Clothing and bedding should be steamed, and wall paper in clean houses and with no sputum attached might be cleaned with bread dough.

Various members spoke of spittoons, and the general opinion seemed in favor of some form of combustible receptacle contained in a metal or porcelain carrier.

CONTROL OF MEAT AND MILK SUPPLIES

Mr. Shirley Murphy opened a discussion on the control of meat supplies. He said there was very little new to be said on the subject. He gave a review of the measures adopted in England for the prevention of the sale of tuberculous meat, but added that there was always the possibility of a tuberculous animal being slaughtered under conditions avoiding inspection. Other speakers spoke in the same vein.

In the discussion of milk supplies, nearly every speaker took occasion to disagree with Professor Koch, and to express the opinion that tuberculous milk was dangerous to man as a food. Professor Delapine thought no animal could be declared free of tuberculosis unless the tuberculin test had been applied.

SANATORIA

In opening a discussion on the provision of sanatoria, Sir James Creigh-

ton-Browne said that sanatoria were needed for two reasons, first to cure those affected in curable cases, and second that incurable cases might be removed so as not to be a source of infection as well as having a life prolonged and the comforts necessary to their condition. It was held that the tendency to spontaneous cures were what made sanatoria so necessary, and it ought to be brought within the limit of all classes. He thought there ought to be three classes of sanatoria, first, for the affluent; second, for the competent, and third, for the poor.

CLIMATOLOGY

In opening a discussion on climatology, Dr. Theodore Williams said that in whatever climate the patient was treated the great object was to get him into the open air and to live under the most favorable hygienic conditions. The climate that best fulfills the open-air treatment need not be a very warm or a very cold one, but should be dry and stimulating, and with abundant sunshine, admitting of much exercise and producing nervous and muscular vigor. Climates might be classified as, first, marine climates, including sea voyages; second, mountainous climates, partly inland, partly marine, and third, mountainous climates. Under marine climates are the south coast stations of England and Ireland having an equable temperature and a good deal of wind with considerable rain and many rainy days. They were suitable for chronic cases and especially the strumous forms. Sea voyages were going out of vogue, partly at least, because steamers made the trip too short, and also because of the disadvantages of the close cabin and the lack of exercise and also because other methods of treatment had come into use.

Under dry warm climates are, first, the desert, giving dryness and warmth, sunshine and great radiation with the consequent great variation of day and night temperature, and the asepticity of the atmosphere. In experience these climates produce a diminution of secretion and improvement and quiescence, but seldom absolute arrest. Second, comes the warm dry climate of the Mediterranean basin. It is cooler and more stimulating than the desert and clearer and with less fog and rain than the English-coast stations, and the cool nights are especially advantageous.

Mountainous climates are characterized by: First, diathermancy; second, asepticity, and third, by the physiological effects on the body, tanning the skin, at first quickening, then slowing the circulation, and fuller respiration accompanied by dilatation of the thorax. He gave statistics of 385 cases treated in high altitudes in various places, the treatment averaging eleven and a half months. The results were that 173 or forty-five per cent completely recovered, seventy-seven or twenty per cent greatly improved, and fifty-four or fourteen per cent improved, so that in all 334 improved. His conclusions as regards the effects of the high altitude on consumption are, first, that the respiration of the rarified atmosphere produces hypertrophy of the healthy lung and local pulmonary emphysema around the tuberculous lesion, giving rise in due time to thoracic enlargement; second, that it is possible the arrest of tuberculous disease is at least partly due to the pressure exercised on the tuberculous masses by the increasing bulk of the surrounding lung tissue, which, by emptying the blood vessels, promotes caseation and cretification of the tubercle; third, that these changes are accompanied by general improve-

ment in digestion and assimilation, the cessation of all symptoms of disease, the return of normal functions by gain of weight, of color, of nervous and muscular activity, and of respiratory and circulatory power; fourth, that arrest of disease takes place in fifty-eight per cent of tuberculization cases and great improvement in eighty-seven per cent; that in excavation cases arrest occurs in twenty-one per cent, and great improvement in sixty-one per cent; fifth, that the climate is especially beneficial in hemorrhagic phthisis and phthisis in which hereditary predisposition is strongly marked, and is well suited to chronic tuberculosis of the lungs in general; sixth, that males and females seem to do equally well and to profit most between the ages of twenty and thirty, and seventh, that the climate is contraindicated in acute phthisis, catarrhal phthisis, in laryngeal phthisis, in cases of phthisis accompanied by great nervous irritability, in cases of double cavities with fibroid phthisis and in all patients whose pulmonary surface has been so much reduced from any cause that it does not suffice for complete respiratory purposes.

Dr. Burney Yeo followed on much the same lines, the objects of treatment by climate being, he stated, to arrest catarrhal conditions of the air passages, to improve nervous and circulatory tone, to increase the activity of the digestive functions and thus stimulating nutrition by promoting the desire and increasing the power to exercise, to raise the moral tone by affording a clear, bright, and cheerful environment, and to diminish by its asepticity bacteriological activity.

In conclusion, he stated that a suitable climate relieves or removes catarrhal conditions accompanying the disease in a number of cases; it raises nervous and vascular tone, it increases muscular energy and the ability as well as the desire for exercise; by rendering an open-air life possible, it increases the aëration of the lungs and diminishes the activity of bacterial agencies. It improves the tone and promotes the activity of the digestive functions.

In regard to suitable climate, he said that cases treated at the commencement of the disease, and who were otherwise in good health, may be permitted a certain amount of latitude in the choice of climate. Second, for progressive febrile cases, repose in bed or on the couch at home is the best condition practicable for the free access of air and sunshine. Third, for catarrhal cases, soothing climates like Madeira or Teneriffe are best. Fourth, for rheumatic or gouty cases of the fibroid type, dry marine climates or the desert are most suitable.

USE OF TUBERCULIN

The discussion regarding the therapeutic and diagnostic value of tuberculin was opened by Dr. Heron, who gave a short history of it, and thought it had fallen into disuse owing to its frequent use in unsuitable cases, its administration in too large doses, neglect of the rule that a dose should never be given until the patient's temperature has been normal for the previous twenty four hours at least, neglect of the rule that the dose of tuberculin should never be increased, but rather diminished, when its administration has been followed by a rise of temperature, and the prejudice raised against the remedy among both medical men and patients, because of the severity of the symptoms which not seldom follow upon its use. Of fifty-one cases treated by him, seventeen were lost sight of, and of the remaining thirty-

four, sixteen were known to be well. Lupus did well up to a certain point and then relapsed. One case of lupus treated by the new tuberculin recovered permanently. Tuberculin was now known to be worse than useless in cases of mixed infection. For diagnosis, tuberculin was most valuable, making very early diagnosis possible, when the chances of recovery were best.

Professor Koch said that if the diagnostic injections were properly made in the human subject, it was a valuable method and without danger. The injections should be small enough in weak subjects; not more than $\frac{1}{10}$ mm. was enough to begin with, and no second injection should be given until the temperature was again normal. If the first injection gave a faint reaction a second injection of the same quantity frequently gave a very marked reaction. Over 3,000 cases had come under his observation, and he concluded that the diagnostic test of tuberculin was almost absolute. As a therapeutic agent he had no doubt it was of great value in early uncomplicated cases, and when used in these cases a complete cure frequently resulted. In advanced cases it was necessary that the temperature should be normal before the injections began. The treatment should be continued over a long period, if necessary, with intervals of three or four months, until they gave no reaction. In answer to a question, Professor Koch said the tuberculin was prepared from tubercle bacilli of human origin; but that the reaction was produced in both man and cattle, and though the bacilli were different they possessed a common "group" reaction.

Many members spoke for and against the use of tuberculin, but most were agreed that its diagnostic value was great and harmless, but opinion was much divided on the curative qualities.

DISCUSSION ON SANATORIA

In opening the discussion on sanatoria, Dr. Clifford Allbutt said that open-air treatment was possible at home, but was best carried out in sanatoria and had been perfected there. The coldest air possible was the best stimulant for the appetite and made forced feeding unnecessary, but it varied for different individuals. What a young man could stand was too cold for an old or a weak one. Two degrees of cure were possible in sanatoria, arrest or obsolescence; but the latter was hardly possible with the poor, requiring on the average two winters and one summer; so an economic cure was to be aimed at rather than absolute cure. Six months would be required in the majority of cases. He protested against the emptiness of mind advocated by some reformers and would give amusement and tranquil occupation.

Dr. Philip, as a result of ten years' experience, said that each case must be treated *per se*; rest and exercise must be considered together and regulated by the temperature and the pulse; a full dietary was necessary, but not forced feeding. The location of the sanatorium was not dependent upon the surroundings or ground; it could not be too far from the large centers of population, and it was better if patients were treated in their native air.

Dr. Burton-Fanning presented a report of the sanatorium treatment in England, covering 716 patients from sanatoria where patients paid their way. As a result, 92 per cent gained weight; quiescence or definite recovery occurred in 25.1 per cent; of patients without fever or quickened pulse, 63.6 had quiescence or recovery.

THE RÖNTGEN RAY IN TUBERCULOSIS

In discussing the use of the Röntgen ray in the diagnosis of pulmonary tuberculosis, Dr. Walsham said that in normal lungs they were quite transparent from apex to base, with the exception of a few ill-defined, shadowy lines to the right of the heart. The movement of the diaphragm like a piston up and down was ordinarily equal on the two sides of the chest, but in disease was much less on the affected side, even when the disease was limited to one apex. In well-developed cases of tuberculosis the diseased areas showed as flocculent shadows punctate in parts. He would say that the rays could not decide the earliest stage of tuberculosis in the lungs, but they would definitely show tuberculosis, and that at a very early stage,

THE TUBERCLE BACILLUS

Dr. Alfred Moeller, of Belzig, in opening the discussion of the morphological and physiological variations of the bacillus of tuberculosis and its relation to other bacteria resistant to acids and to the streptothrices, said that he had shown that bacteria which were acid fast were not necessarily tubercle bacilli, as, for instance, the smegma bacillus and the bacillus of avian tuberculosis. A series of bacilli resembling the tubercle bacillus had recently been found, including the butter bacillus and the Timothy bacillus. The tubercle bacilli, like all the acid fast bacilli, seemed to belong to the streptothriciæ.

RESOLUTIONS ADOPTED BY THE CONGRESS

The last general meeting was held on the afternoon of July 26 and the following resolutions were adopted:

1. That tuberculous sputum is the main agent for the conveyance of the virus of tuberculosis from man to man. Indiscriminate spitting should, therefore, be suppressed.
2. That it is the opinion of this congress that all public hospitals and dispensaries should present every out-patient suffering from phthisis with a leaflet containing instructions with regard to the prevention of consumption, and should supply and insist on the proper use of a pocket spittoon.
3. That the voluntary notification of cases of phthisis attended with tuberculous expectoration and the increased preventive action which it has rendered practicable has been attended by a promising measure of success, and that the extension of notification should be encouraged in all districts in which efficient sanitary administration renders it possible to adopt the consequential measures.
4. That the provision of sanatoria is an indispensable part of the means necessary for the diminution of consumption.
5. In the opinion of this congress, in the light of the work that has been presented at its sittings, medical officers of health should continue to use all the powers at their disposal and relax no efforts to prevent the spread of tuberculosis by milk and meat.
6. That in view of the doubts thrown on the identity of human and bovine tuberculosis, it is expedient that the government be approached and requested to institute an immediate inquiry into this question which is of vital importance to the public health and of great consequence to the agricultural industry.

7. That the educational work of the great national societies for the prevention of tuberculosis, is deserving of every encouragement and support; it is through their agency that a rational public opinion may be formed, the duties of public health officers made easier to perform, and such local and state legislation as may be required called into existence.

8. That this congress is of the opinion that a permanent international committee should be appointed to collect evidence and report on the measures that have been adopted for the prevention of tuberculosis in different countries, to publish a popular statement of these measures, to keep and publish periodically a record of scientific research in relation to tuberculosis, and to consider and recommend measures of prevention. This congress is further of opinion that such a committee should consist of representatives to be elected by the great national societies formed for the suppression of tuberculosis and also representatives nominated by various governments. It is further of the opinion that all international committees and great national societies whose object is the prevention of tuberculosis should be invited to cooperate.

9. In the opinion of this congress, overcrowding, defective ventilation, damp general unsanitary condition in the houses of the working classes, diminish the chance of curing consumption and aid in pre-disposing and spreading the disease.

10. That while recognizing the great importance of sanatoria in combating with tuberculosis in countries, the attention of governments should be directed towards informing charitable and philanthropic individuals and societies of the necessity for anti-tuberculous dispensaries as the best means of checking tuberculous disease among the industrial and indigent classes.

Respectfully,

A. R. THOMAS,

Passed Assistant Surgeon, U. S. M. H. S.

The SURGEON-GENERAL,

U. S. Marine-Hospital Service.

XV

THE BUBONIC PLAGUE

There is no disease of modern times so fatal as the plague, and none so persistent in its occupancy when it once gets a good foothold.

It has been approaching the west from India and China so menacingly, and appearing at so many unexpected points, that the people, especially the health authorities, should be thoroughly informed in regard to it, in order, if possible, that an outbreak may be averted; or if occurring, should be stamped out as promptly as possible. To that end we present herewith a valuable contribution to the literature of this disease by DR. WALTER WYMAN, Surgeon-General Marine Hospital service, which we are kindly permitted to reprint:

LETTER OF TRANSMITTAL

TREASURY DEPARTMENT
OFFICE OF THE SUPERVISING SURGEON-GENERAL
MARINE-HOSPITAL SERVICE

WASHINGTON, D. C., Jan. 6, 1900.

The Secretary of the Treasury:

SIR: I have the honor to submit herewith an article on the bubonic plague, being a revision of the article prepared by myself and published in the annual report for 1897.

Within the past two years many facts of importance have become known with regard to this insidious epidemic disease, and it is the object of this revision to embody in available form the latest information which may be of practical value to quarantine officers, health officers and others.

In this undertaking I have had the assistance of Passed Assistant-Surgeon H. D. Geddings, who was the technical delegate from the United States to the International Plague Conference in Venice in 1897, and subsequently was ordered to the Pasteur Institute in Paris, to familiarize himself with the latest scientific advances in the bacteriology of this disease. Valuable information also has recently been forwarded by Surgeon Eugene Wasdin, now engaged in like manner in the Pasteur Institute.

From the facts set forth in the article it is obvious that the greatest care must be exercised in the *inspection at quarantine* of vessels, even thou g

they hail from non-infected ports, for they may carry passengers, crew, stowaways or merchandise from plague-infected districts.

Attention is called to the ambulant, or walking form of the disease, which might readily escape detection by ordinary inspection, but becomes as active an agent in dissemination as the more violent form.

With great care in inspection and enforcement of other regulations at domestic ports, supplemented by the information conveyed by medical officers of the service in foreign ports and their surveillance over vessels, it is hoped that no case of plague will be admitted. But should this misfortune occur, the observations detailed in the article show that energetic sanitary measures may be made to avail, while we have in the curative serum and the Haffkine prophylactic additional and effective weapons in preventing the spread of the disease. While these facts are encouraging in character, it should not be forgotten that the epidemic is surely, though slowly, extending, and that for the first time in history it has invaded the Western Hemisphere.

The necessity, therefore, of especial vigilance has been, and is still being, impressed upon quarantine officers by the Bureau; and of equal importance is the provision which should be made by municipalities, especially those on the seaboard, to correct immediately unsanitary conditions which are now so well known to favor the propagation of infectious disease.

New facts as they develop and new measures which may become necessary will be duly promulgated in the Public Health Reports issued weekly by the Bureau.

As this brochure is intended to be one of practical utility, I have to recommend that authority be granted for its publication.

Respectfully,

WALTER WYMAN,
Supervising Surgeon-General Marine-Hospital Service.

Approved:

L. J. GAGE, *Secretary.*

THE BUBONIC PLAGUE.

The plague, known also as the bubonic plague, *Pestis bubonica*, Levantine, Oriental, and black plague, and black death, is a disease which has ravaged from time to time the several countries of Africa, Asia and Europe almost from time immemorial. The literature on the subject is appalling in extent, a mere enumeration of titles with authors covering forty pages, royal quarto size, of the Index Catalogue of the Library of the Surgeon-General's Office, United States Army, and a score or more of the columns of the *Index Medicus*, published since the issue of the Index Catalogue in 1889.

Manetho, an Egyptian historian, who lived at the beginning of the third century B. C., described pestilences, supposed to have been the plague, as having occurred in the reign of the most ancient Egyptian kings. It prevailed in Athens 432-429 B. C., and reappeared in eighteen months after the last-named date. Thucydides has described it, and had the disease, and Hippocrates noted it. It is said that Athens lost more than one-third of its population by the epidemic.

According to Rufus of Ephesus, plague prevailed in Lybia in the third century B. C., and its home was considered to be in northern Africa. The

great plague reported by Livy, who died 221 B. C., is said to have destroyed a million of persons in Africa, but it is not mentioned that it passed into Europe. Plague is also alluded to in the Bible, Zachariah xiv, 18, as peculiarly Egyptian, of which country this disease has been a great scourge.

In the Christian era it is not until the sixth century that we find bubonic plague in Europe. In 542 it spread over Egypt; and passed to Constantinople, where it carried off 10,000 persons in one day, and in the same century appeared in Italy, and extended also along the northern coast of Africa. It prevailed in England in the seventh century.

In the fourteenth century it was introduced from the East and prevailed throughout Armenia, Asia Minor, Egypt, northern Africa, and nearly the whole of Europe. Hecker calculates that one-fourth the population of Europe, or 25,000,000 persons, died in all of the epidemics in the fourteenth century. It was in this century that the first measures were taken to check the spread of the plague, Venice appointing in 1348 three guardians of the public health for this purpose.

In the fifteenth century it recurred frequently in nearly all parts of Europe, in one year, 1466, the mortality reaching 40,000. The first quarantine establishment was founded in this century, namely, at Venice, in 1403, on a small island adjoining the city.

The sixteenth century was not more free from plague than the fifteenth. In 1572 50,000 died at Lyons. In 1576 Venice lost 70,000.

In the seventeenth century it still prevailed in Europe, though less widely than in the middle ages. In 1656 one of the most destructive of all recorded epidemics raged in Naples. It is said to have carried off 300,000 in a period of five months. The great plague of London was in 1664 and 1665. The total number of deaths in 1665, according to the bills of mortality, was 68,596 in an estimated population of 460,000, out of whom two-thirds are supposed to have fled to escape contagion.

In the eighteenth century it prevailed extensively in Europe, the most notable epidemics being in Marseilles (1720), when from 40,000 to 60,000 persons were carried off. In 1721 it appeared in Toulon and spread over Provence, and out of a population of 250,000 persons 87,659 are said to have died. Sicily was visited in 1743, namely, at Messina, where the mortality was between 40,000 and 50,000. In 1771 it broke out in Moscow, and more than 50,000 persons, nearly one-quarter of the population, were carried off.

The nineteenth century has been marked by a recession of the plague toward the East, although in 1815 it appeared on the eastern coast of Italy, confined to a small district—its last appearance in that country. An isolated epidemic appeared in Greece in 1828. It appeared in Egypt between 1833 and 1845, the last year witnessing the last plague epidemic observed in that country and marking its great eastward recession.

There was an epidemic of extreme severity in Cairo, 1835, during which there died a number of the inhabitants equal to the whole adult male population.

In 1840, Dalmatia; in 1841, Constantinople, and in 1843 and 1844, the eastern part of Egypt, were its western boundaries.

THE PLAGUE IN THE LATTER PART OF THE NINETEENTH CENTURY—THE "PLAGUE BELT"

Since 1850 the western limit of the plague is the Canary Islands, 1852.

while its eastern limit is the Island of Formosa, off the coast of China, where it now prevails.

Since 1850 the disease has oscillated, now east and now west, between the Red Sea and the Pacific, in China, India, Arabia, Persia, Mesopotamia, Russia, Caspian Sea, Afghanistan, Tripoli. There have been since 1850 but nineteen years when it has not been recorded in one or the other of these countries. The last outbreak of plague on European soil was in 1878 and 1879, on the banks of the Volga.

As to the "plague belt" it may be said that since 1850 the disease has never traveled farther north than Astrakhan, about 45° north, although within the present century it has visited Moscow, Norway, Sweden and latitudes as far as 60° north. During the nineteenth century the belt of the plague, according to Cantlie, may be roughly described as the basin of the Mediterranean and the strip of country in Asia from Turkey to China, running parallel to that sea; but the mediterranean part of the belt has disappeared almost wholly within the present generation.

Formerly it was asserted that the plague never appeared east of the Indus in India; nevertheless it has been observed during the present century in more than one distinct center in India. Of late years, since 1871, it has been heard from, particularly in China.

It should be remarked in this connection that according to Lowson the history of the disease in the far east is, with the exception of Rocher's Papers, a perfect blank. Chinese history makes no reference to any epidemic which has left a permanent record.

THE ORIGIN AND SPREAD OF THE PRESENT EPIDEMIC OF PLAGUE

While comparatively isolated outbreaks of plague have occurred in Asiatic countries from time to time, it seemed improbable that there would be any more extensive epidemics of the disease. This hope was rudely dashed down by the appearance of the disease in 1893 in epidemic form in Tonkin and Hongkong, and within a short time after in Bombay, Kurrachee and Poonah, in British India.

In 1892 it was deemed necessary by the Chinese Government to increase and maintain the garrisons on the Manchurian frontier. There was necessity for frequent and intimate intercourse between Longtcheu and Yun Nan, the latter an endemic focus of the disease, and transportation of stores and materials was affected by means of mule caravans. The distance was about 200 kilometers; the time occupied in the trips was five or six days. The disease made its appearance in Longtcheu in 1893, and muleteers were the first victims. The disease spread in Longtcheu and assumed epidemic proportions, and was conveyed by means of the crews and passengers of trading junks to Canton and Hongkong, in which cities it appeared in epidemic form in 1894.

There is no doubt that the plague was conveyed by sea from Hongkong to Bombay, and in that city it broke out in the Mandvi quarter, which is in close proximity to the docks, and which contains many and large warehouses for the storage of merchandise from Chinese ports. Kerachee and Poonah were either infected from the same source or, most probably, from Bombay as the infecting focus. Through the channels as detailed above has resulted an epidemic outbreak which in Bombay (presidency) alone has

resulted in 220,907 cases, with the enormous mortality of 164,083; in Hong-kong 1,600 cases, with 1,541 deaths; Amoy, within a limited period, 540 deaths; Calcutta, approximately, 500 deaths, and in Formosa 2,468 cases, with 1,866 deaths.

Plague has also recently been introduced into Alexandria, Egypt, but thanks to severe restrictive measures has made little headway, and now seems to be under control.

There is a seemingly correct statement of its introduction into Kobe, a port of Japan, by means of infection conveyed in a bale of cotton, but the question is still involved in some doubt.

Plague was introduced into Nieuchwang, in July, 1899, through the persons of arrivals from more southern districts, probably with ambulant types of the disease, who infected their surroundings and the soil and set up an epidemic whose manifestations were preceded by very large mortality among domestic animals—as rats, dogs, chickens (?), and cattle. It is supposed, also, that the use of cattle dead of plague for food among the inhabitants was in a measure responsible for the spread of the disease.

More important to us still was the announced appearance of the disease in Oporto, Portugal, in August, 1899. How the infection was introduced is a matter still shrouded in some mystery. Reputedly it has been traced to a cargo of rice from some of the Indian plague-infected ports, but this theory is open to the objection that the cargo of rice in question was trans-shipped in English ports and there cleaned and prepared for use. However this may be, it is certain that the disease made its appearance in a hovel near the water front, where dwelt two laborers who were occupied in unloading this and other ships. It is well known that from time to time the ships of the Peninsular and Oriental Line have brought cases of plague from Bombay to Plymouth, but there is no record of any spread of the disease. Is it not possible that, owing to the lack of any quarantine restrictions in the British Isles, cases of the ambulant type may have escaped observation, and passengers and crew from some of these ships be responsible for the infection of others?

The appearance of the plague in Santos, Brazil, in October 1899, marks an important epoch in plague literature, as furnishing the very first recorded instances of the occurrence of the disease in the Western Hemisphere. There is also considerable difference of opinion as to the origin of the Santos outbreak. It is usually attributed to the ship *Rei de Portugal*, which arriving from the infected port of Oporto, lay alongside the dock in Santos, and within a short time there was an extensive mortality among rats, followed within a short time by the appearance of cases among human beings. But it is recorded, too, that on two occasions prior, in the months of July and September, 1899, there was an unexplained and great mortality among rats in the city of Santos, and that the first suspected case of plague was in the person of a patient who had been sent to the yellow-fever hospital, and in whom, after death, large buboes were discovered. It is regarded as equally possible that instead of the disease having been introduced from Oporto it may have been introduced by a rice-laden ship from Rangoon or by a ship from Tamatave, Mozambique, and that earlier mild cases may have passed unrecognized, and only when a death occurred under the conditions mentioned above was suspicion aroused.

Up to the present time the disease in Santos has spread rather slowly, but the sanitary conditions are notoriously bad, and while the best is hoped it is reasonable to fear further spread.

From Santos the disease extended to Sao Paulo, a hill resort in the neighborhood, the first case occurring in a child of a switchman of the railroad connecting the two places. The employe in question lived in a cabin or hovel immediately alongside of the railroad.

On the 18th of November, 1899, the British steamship, J. W. Taylor, from Santos, arrived at the quarantine station of the port of New York, from Santos, with two cases of bubonic plague on board, and having lost one man at sea from the same disease. Prompt measures as to the ship, her crew, and cargo were taken, and fortunately no spread of the disease has occurred.

In the light of experience in other parts of the world, and with even a cursory study of the sanitary conditions obtaining in the places infected with plague, it seems reasonable to believe that even were the disease introduced its spread would be very limited in cities where the sanitary conditions are good and where precautions as to the isolation of patients and the segregation of those exposed to infection could and would be practiced. Cases in Vienna, resulting from accidental inoculation while studying the disease in one of the laboratories, were controlled and were limited to the two original victims and a physician and nurse who ministered to them. The same may be recorded of a case introduced into Trieste, Austria. No spread of the disease followed. With the rigid application of the ordinary principles of sanitary science and with the means now at our disposal for the prophylaxis and cure of the malady, it seems extremely doubtful if the plague will ever secure a decided foothold in the United States.

In the latter part of December, 1899, the plague made its appearance in Honolulu, Hawaiian Islands, where it had been previously introduced, but had been suppressed without extensive spread. Being confined at this time to the Chinese quarter of the city and vigorous repressive measures having been instituted, it is to be hoped that a general spread will be averted and this new source of danger to the United States removed.

OUR MODERN KNOWLEDGE OF PLAGUE

This disease furnishes a striking illustration of the scientific advance of modern medicine. It was not until 1894 that positive knowledge of its true nature became known. Now its cause, method of propagation, and the means to prevent its spread are matters of scientific certainty. True, investigation is still necessary to make this knowledge complete, but enough is known to warrant the foregoing statement. All through the centuries, before and during the Christian era, down to 1894, the subject has been enveloped in darkness, and there has been the same groping after facts, the same unsuccessful search for the true cause, the same struggle in ignorance against its ravages on the part of physicians, sanitarians, and public officials as has marked the history of that other great epidemic disease, cholera, now likewise robbed of its terror by science.

One has but to reflect upon the vast amount of research, thought, and labor involved in the preparation of that mass of literature previously referred to, and to the misery, disaster, and death of which it is the exponent,

in order to appreciate the value of the great discovery of 1894. It is to the immortal Pasteur and his contemporary, Koch, in their establishment of bacteriology as a science, that credit is due for the possibility of this discovery, and to a Japanese physician, Dr. Kitasato, a student in the laboratory of Koch, and Yersin, a pupil of the Pasteur Institute, we are indebted for the discovery itself.

When, in 1894, the plague was epidemic in Hongkong, hundreds dying daily, great apprehension existed on the part of Japan, and accordingly Drs. Kitasato and Aoyama, with assistants, were commissioned by the Japanese Government to visit Hongkong and there study the disease, the former to make bacteriological investigation and the latter to report upon its clinical and pathological characteristics. The report of Kitasato announcing the discovery of the plague bacillus was published under the auspices of the University of Tokio, July 7, 1894, and may be found in full in the Annual report of the Marine-Hospital Service for 1894. Other investigators during the same year were, on the part of the English, Drs. Lawson and Cantlie; on the part of the French Government, Dr. Yersin; of the German Government, Dr. Wilm; and the United States was represented in these investigations by Dr. Arnold, of the Navy, to whom we are indebted for the cultures which form the basis of the experiments now being conducted in three laboratories in the United States.

Plague; or malignant polyadenitis, as it has been termed by Cantlie, has been defined as an acute febrile disease, of an intensely fatal nature, characterized by inflammation of the lymphatic glands, marked cerebral and vascular disturbances, and by the presence of a specific bacillus. Although one gland alone may be clinically apparent, most, if not all, of the lymphatic glands are found to be enlarged at the post-mortem examinations.

The micro-organism invades the blood and forms numerous and extensive colonies in the spleen, especially when death is delayed beyond the second day. It is practically a septicæmia.

In a varying period of twelve hours to twelve days, usually within four days after exposure, the disease makes its appearance in the individual. The patient complains of high fever, a swelling of one or more of the lymphatic glands, and has delirium early in the attack, though seldom violent. The fever persists at least a week, and convalescence thereafter is slow. In fatal cases, death usually occurs at the height of the disease, between the second and eighth day, frequently within forty-eight hours. If life is prolonged for five or six days the prognosis is better. The glands most commonly affected are those of the thigh and groin, next of the axilla, and sometimes those in the neck. The swollen gland quickly attains the size of a hen's egg, and, unless death intervenes, after five or six days the gland may soften and be filled with pus, which may be evacuated. In many cases of the severer type the bubo has not time to form, and then there are hemorrhages from the mucous membranes and beneath the skin—hemorrhagic extravasations— the so-called petechial spots. It is probably this phenomenon, giving a dark appearance to portions of the skin, which has given the name of "black death" to the disease. Large buboes may form in a few hours after a time when a person has felt in the best of health; and, on the other hand, patients die of the disease without the appearance of a sin-

gland affected gland, although the post-mortem examination shows the glands to be slightly swollen, and their substance contains the plague bacillus.

Death is generally the result of a toxæmia, the effects of the toxins produced by the bacillus being shown as a meningitis or cerebritis; indeed, the seat of election for the action of the toxins would seem to be the central and axial nervous system, which are the seat of punctate hemorrhages and hemorrhagic infarcts, the toxins apparently acting by causing a breaking down of the walls of the capillary blood vessels.

The death rate varies in different epidemics, and is estimated at from 50 to 90 per cent. It varies, however, apparently according to nationalities. From the official reports of the epidemic in Hong Kong in 1894, the following table shows the death rate of the several nationalities named: Chinese, 93.4 per cent; Indians, 77; Japanese, 60; Eurasians, 100; Europeans, 18.2. The small relative percentage of deaths among Europeans is attributed to the European blood and stamina and to the early treatment and confidence in the European medical attendant.

SUGGESTED CAUSE OF PREVALENCE IN INDIA AND CHINA

An interesting suggestion as to the cause of the prevalence of this disease in India and China is offered by Dr. Charles W. Dabney, jr., formerly Assistant Secretary of Agriculture, to the effect that it may be because the people of India are so badly fed, and fed only on rice and other grains, which contain very little protein. As compared with wheat, oats, Indian corn and rye, rice, by the protein standard, is the poorest food of them all. Additional credence may be given to this theory from the fact that plague so often accompanies famine. Other conditions are known to favor it, such as overcrowding and filth; but in cities and localities where these two elements are present, while the disease has raged violently, it has been made in time to disappear; while in India, where these conditions prevail, with faulty nutrition added, the disease is persistent. Following is the letter of Dr. Dabney containing the suggestions mentioned:

WASHINGTON, D. C. February 3, 1897.

DEAR SIR: In pursuance of our conversation of Monday evening, I take pleasure in handing you herewith some suggestions which have come to me with regard to the reasons for the persistence of the bubonic plague in certain oriental countries. The density of the population, which in certain portions of Bombay approximates 1,000 to the acre, the filthy habits of the people, the heat of the tropical climate, the absence of pure water, the crowded and badly managed cemeteries, and the utter ignorance of all sanitary laws doubtless combine to give rise to conditions which would favor diseases of this sort.

But why is it that this disease is continuously present in certain oriental countries and does not persist in occidental countries, even among people who are equally filthy and crowded together fully as densely as those in China and India. If it is density of population and filth that alone keep the disease going, why do we not have it all the time in Egypt or Africa, in Italy, in Spain, and even in the West Indies and South America? The population in certain tenement districts in New York City is almost as dense as in the section of Bombay referred to; though distributed more in altitude, perhaps, through the great tenement houses. I can testify that the negroes in our Southern cities are certainly filthy enough to make it possible there if that were all that is required for the disease.

I have asked myself, therefore, what other condition exists in the east that does not exist among these other peoples?

It is well known that the poorer classes in India live largely upon grains, chiefly rice and pulse, with very little meat or fish. Many classes among them are vegetarians. There is a want of accurate dietaries, but from the report of Cornish (Nature of the Food of the Inhabitants of the Madras presidency) and from the unpublished statements of professor Atwater,

said to have been compiled from the reports of intelligent and careful missionaries, it is evident that under normal conditions the Indian peasantry are among the poorest-fed people in the world. They are not at all delicate in their diet, but gladly consume any kind of vegetable food, and will even eat decaying fruits and tainted meat or fish.

Calculations based upon data supplied from these sources show that the food of the Indian peasant does not afford, on the average, more than 1,200 to 1,400 calories per man per day. We know that 2,000 calories is considered the lowest upon which a grown person can maintain comfortable existence, while 3,000 calories is the amount usually allotted for a man at ordinary work. We have nothing equaling the poverty of the Indian's dietary except that of the poorest Russian laborers, existing chiefly on buckwheat and animal fat, yielding only 1,600 calories.

Similarly the reported dietary of the poor Malays, among whom the plague plays great havoc, is said to have consisted for their whole lives of nothing but rice and fruit, yielding not exceeding 2,000 calories. The Indian peasant, in fact, appears to be always in a condition verging on famine, so that he would be a ready victim of disease of any kind.

These facts seem to suggest that one reason, at least, why the plague persists in the east is that the people are so badly fed, and fed only on rice and other grains, which contain very little protein. We know that, compared with wheat, oats, Indian corn, and rye, rice, by the protein standard, is the poorest food of them all.

Respectfully yours,

CHAS. W. DABNEY, JR.

THE PLAGUE BACILLUS

As first described by Kitasato, the cause of the disease is a bacillus somewhat resembling that of chicken cholera, a small, short rod, with rounded ends, of the nonspore-bearing variety, characterized by its property of extremely rapid multiplication and the facility with which it enters the human organism. It is found in large numbers in the pus from the buboes, occasionally in the interior organs, in grave cases in the blood, and in the feces. It is also found in the dust of infected houses and in the soil. While so virulent, its resisting power to chemical disinfectants is feeble, succumbing shortly in a 1 per cent solution of carbolic acid or of limewater. It dies in four days if kept at a dry heat of 60 degrees C., or 140 degrees F., or in half an hour if subjected to a temperature of 80 degrees C., 176 degrees F., and in a few minutes if subjected to a heat of 100 degrees C., 212 degrees F. As demonstrated in the hygienic laboratory of the Marine Hospital Service, it is easily destroyed by all of the ordinary disinfectants. On the other hand, it develops easily in many culture-media at the ordinary temperature, 18 degrees to 22 degrees C., or 64.4 degrees to 71.6 degrees F.

A subsequent description by Yersin (whose discovery was coincident with Kitasato's) differs somewhat from the above, and as detailed by him and confirmed by Roux is as follows: A cocco-bacillus, almost as broad as long and about 2 micromillimeters in greatest diameter. Stains very readily with the ordinary aniline dyes, but is easily overstained, thus masking its true characteristics. Is best stained with a 1 per cent solution of thionin, carbolyzed, when it shows as a cocco-bacillus, staining more deeply at the poles than in the center and forming chains of three or four elements. Is completely decolorized by the method of Gram. Grows readily upon ordinary media, as peptone-agar, peptone-gelatine, and peptone-bouillon. Does not liquefy gelatine. Upon agar the separate colonies are very small round in shape, almost transparent by transmitted and white by reflected light. In bouillon, under ordinary conditions of temperature, it forms flakes or flocculi, which rapidly sink to the bottom of the flask or test tube, leaving the liquid above clear. This is characteristic. Examined in the hanging drop, the organism is absolutely devoid of automobility.

In old cultures upon agar and bouillon the organism rapidly assumes involution forms, some of which are very curious, and most prominent among them is that of a rather long, slender bacillus, segmented, and presenting a vacuolated appearance. In this state they stain badly and have notably lost some of their virulence.

The differences in the two descriptions as detailed above may be accounted for by the pleomorphism of the bacillus in old cultures, but the latter is the form usually met in animals subjected to experimental inoculation and in patients recently dead with the disease.

Viability of the plague bacillus.—It would seem that the bacillus of plague, while not as sensitive to desiccation as the cholera spirillum, still loses its virulence by drying, and that to retain its virulence it requires the action of both heat and moisture. The presence of organic matter, animal or vegetable, and in a state of decomposition, would seem to furnish the most favorable nidus for its growth, which will account for its more or less prolonged existence in oriental countries and the comparative rarity of its appearance in Europe since the existence of modern and improved hygienic conditions. This does not mean, however, as was maintained by some of the Venice conference, that filth and crowding are alone responsible for the disease. The malady is preeminently of bacterial origin, and wherever the microbe is found, there the plague is likely to develop.

The length of its life when exposed to favorable conditions outside of the human body has an important bearing upon the quarantine measures necessary to be enforced, particularly with regard to merchandise from an infected port.

The following report of experiments on the viability of the plague bacillus has been published by S. L. Rappoport, St. Petersburg. The material used was allowed to soak in bouillon cultures of bacillus pestis in a dark closet for twenty-four hours, then exposed for successive days to all the sunlight obtainable, or to dry heat.

TEMPERATURE AND TIME REQUIRED TO KILL

Material.	20° C. (68° F.).	36° C. (96.88 F.).	60° C. (140° F.).	80° C. (176° F.).
Silk thread	19-24 days.....	13 days.....	75 minutes	15 minutes.....
Note paper	10-17 days.....	5 days.....	30 minutes	15 minutes.....
Filter paper	10-24 days.....	7 days.....	45 minutes	15 minutes.....
Linen thread.....	9-13 days	4 days.....	30 minutes	15 minutes.....
Woolen thread....	13-23 days	5 days.....	60 minutes	15 minutes.....

The organism is killed by a temperature of 55 degrees C. for ten minutes by 80 degrees C. for five minutes. Corrosive sublimate solution, 1-18,100, destroys the bacilli immediately; one per cent carbolic acid and one per cent lysol in ten minutes. Mineral acids are very effective. Sulphuric acid, 1-1,000, kills the bacilli in five minutes; hydrochloric acid 1-1,000, in thirty minutes.

LIFE OF THE BACILLUS OUTSIDE OF THE ANIMAL BODY

“The longest time that infected material, as lint, wadding, earth, etc., remained active was eight days. Sputum from patients affected with the the pneumonic form, kept in a vessel plugged with cotton wool, was no longer virulent in sixteen days. In ordinary drinking water the bacilli die

in three days, in sterilized water in eight days, and in sterilized bilge water in five days. In direct sunlight the bacilli die in three to four hours."—(Report of the German Plague Commission, as quoted by Bowhill.) The bacilli are killed by drying at ordinary room temperatures in four days.—(Bowhill. *Manual Bacteriological Technique and Special Bacteriology*, 1899, pp. 197, 198.)

HOW IS THE DISEASE CONTRACTED?

The methods by which the bacilli enter the human body are three in number—by inoculation (through an external wound or abrasion), by respiration and by introduction into the stomach. The Japanese investigator, Aoyama, contracted the disease by inoculation incurred during a post-mortem, and one of his assistants died of the disease contracted in the same manner. According to Lowson, skin to-skin infection is impossible, unless the one to be infected has some wound, and the infector's skin has been soiled by feces, blood, or the contents of buboes. The individual may contract the disease by inhaling the dust from infected houses which contain the germ; furthermore, by imbibing infected fluids or eating infected food.

It may be contracted, therefore, through one or more of the above-mentioned channels, by prolonged and intimate contact with the plague stricken as in the case of a nurse carrying a child ill with the disease; also by the handling of fomites—clothing, bedding, and other infected materials—and by eating with soiled or unwashed hands. Infection from bodies found in the street, in houses, or awaiting burial may take place if the clothes have been soiled by discharges. Cantlie says:

Bulard says sleeping in the dead man's shirt proves nothing further than that the plague-infected garment did not generate the poison of an intensity sufficient to infect. The poison grew every moment more dilute; but a nurse carrying a child throwing off contagion continuously is an exposure of a different stamp.

According to Lowson, the poison is not given off in the ordinary respiration of a patient suffering with the disease, and sputum and saliva from an infected person have given negative results in the only case of which Lowson was able to make investigation upon this point.

HOW DOES IT SPREAD IN HOUSES AND IN LOCALITIES?

The conditions favoring plague are similar to those favoring typhus fever, namely, crowd poisoning, bad ventilation and drainage, impure water supply, famine or imperfect nourishment, and inattention to sanitary requirements. It is probable of this disease, as of yellow-fever, that human habitations and the ground may become so thoroughly infected as to establish endemicity. The bacillus may infect food and water, though how long it will retain its virility in water is as yet undetermined. Clothing and other personal effects, bedding, etc., may be infected through the discharges. The bacillus may be carried in the dust arising through the cleansing of dwelling houses which plague patients have occupied.

A very important element in the spread of plague in houses and localities are rats and other animals. It has been found that rats, mice, snakes, beetles, bugs, flies, dogs and jackals are infected during an epidemic. It is significant that the epidemics do not attack the purely herbivorous animals

—horses, oxen, sheep, goats and rabbits. Rats die in large numbers, and generally this phenomenon is observed in advance of the appearance of the plague among human beings. The cause of their infection is still a subject of discussion. The soil becomes infected; and a very common belief in oriental countries is that the rat contracts the disease from miasmatic emanations from the soil, but this has never been scientifically demonstrated and is probably incorrect. The fact that mortality among rats precedes an outbreak of plague among human beings is explained by Lowson by the fact that rats have their snouts about an inch above the floors of houses and are more liable to inspire plague-infected dust than are human beings.

PREVENTION OF SPREAD IN HOUSES AND LOCALITIES

Modern science, in its development of the serum therapy of disease, appears to have found an efficacious remedy in the prophylaxis and treatment of this disease, which hitherto has maintained an average mortality of 90 per cent. A French physician, Yersin, was the first to use the serum from an immunized horse upon cases of a severe type. At Amoy, in 1896, he treated twenty-three cases of plague in this manner, all of whom recovered excepting two whose cases were desperate from the outset, and upon whom treatment was not begun until the fifth day of the disease. Additional statistics, which follow, confirm the efficacy of this procedure. The method in this treatment is similar to that of the antoxin of diphtheria, the efficacy of which is now thoroughly established.

In the prevention of the spread of the disease in a given house all hygienic measures are necessary, such as proper sewerage, purity of water supply, isolation of the sick, disinfection of clothing and bedding, of the evacuations and sputum, and disinfection of the room; all unnecessary contact with the sick to be avoided, great care to be exercised with regard to food and drink, and, according to Kitasato, after recovery the patient to be kept in isolation for at least one month. It is believed that we have a valuable aid in disinfection of rooms and house in formaldehyd gas, which has now been established as a reliable agent, and which can be used without injury to metals or fabrics. It has the disadvantage, however, of not killing vermin, while sulphur fumigation does. The latter, therefore, is more generally desirable. The general and well-known administrative precautions in the prevention of the spread of smallpox—isolation, guarding of premises, etc.—are applicable to plague.

The advice of Kitasato that the patient should be kept isolated one month after apparent recovery is significant. Like precautions are necessary with regard to other contagious diseases, and too little attention has heretofore been paid to this very necessary precaution against the spread of contagious disease. For example, patients apparently recovered from cholera may carry within the intestinal tract the germs of the disease a variable time, in one recorded instance one hundred and sixty-three days. Patients who have apparently recovered from diphtheria may still be found to have the diphtheria bacillus present in the throat for many days after recovery.

As a means of preventing the spread of the disease mention should not be omitted of the Haffkine prophylactic, the efficacy of which has been demonstrated, as shown further on.

The means to be adopted when the disease becomes epidemic in a city consist, first, of a house-to-house inspection.

There should be prohibition of the use of dwellings unfit for habitation, and abatement of overcrowding should be required. Buildings and premises, if infected or suspected, should be vacated for cleansing and disinfecting. The sick should be removed to hospitals or treated in their own homes and the well who have been exposed should be removed to refuge camps. Infected bedding, clothing, etc., should be destroyed, unless there are proper facilities for disinfection by steam or boiling. An active campaign should be waged against rats and vermin. It is the opinion of some English writers that when plague has been thoroughly fixed and established in a given city its speedy eradication is impossible, that the subsidence requires a period of seven months and seems to depend upon the abatement of its virulence in the due course of its evolution.

Plague in Alexandria, Egypt, during the past summer and fall appears to have been well handled and has apparently disappeared. During the summer 80,000 rooms were disinfected in a scientific manner, and this suggests and illustrates the importance of this disinfection, not only of known infected houses, but of many others in the general neighborhood of the infection, or which by reason of the character of their inhabitants are liable to infection.

THE DISEASE FROM A CLINICAL STANDPOINT—ITS MORTALITY, TYPES, SYMPTOMS, COURSE, ETC.

Mortality.—From the most reliable information collected from all sources, it would seem that the average mortality in this epidemic in India has reached the appalling figure of ninety to ninety-five per cent of those attacked. This is open to some doubt, as the Hindoos have displayed an aversion to treatment in hospitals, and compulsory removal to these institutions having been adopted, many cases occurring among the native population have been concealed and do not appear in the total cases or deaths. The mortality as reported is, therefore, probably rather below than above the truth.

Types of the Disease.—For convenience of classification, and in accordance with the clinical symptoms presented, the disease has been classified as (a) bubonic, or ganglionic; (b) septicæmic; (c) pneumonic. Of these forms the bubonic is the most common, the pneumonic the most fatal. The method of infection—that is to say, the point of entrance of the specific microbe—is a point still under active discussion, and is different not only for the various types and forms given, but also varies in different countries and in different sections of the same country. For example, in Hongkong, where the natives as a rule go barefooted, infection in a large number of cases has been traced to abrasions and wounds of the lower extremities. In India some covering or protection for the foot is usually worn, but the natives suffer from the bites of insects and vermin; consequently the point of entrance of the infection has been largely upon the hands and arms. Infection through the intestinal tract, while admitted, is as yet largely unexplained; for, in spite of the assertions of Wilm, some breach of continuity would seem to be necessary for the entrance of the micro-organism. As a rule, a small red spot marks the point of infection; this becomes successive-

ly a vesicle and a pustule, and in the ganglionic form and in a large proportion of cases a general redness or a series of vesicles marks the passage of the infection along a lymphatic tract or channel. These vesicles have been of very frequent occurrence in the Bombay epidemic.

Symptoms and course.—In the bubonic form the victim is seized with a chill, followed by a fever of greater or less intensity, sometimes reaching 41 degrees to 42 degrees C.; there is an overwhelming prostration; nausea and vomiting and the rapid formation of a glandular enlargement, surrounded by an extensive cedema, forming the bubo which has given the most common name to the disease. The bubo may or may not break down and go on to suppuration. If it does, the ganglionic form merges into the septicæmic, without any distinct line of demarcation between the two types. Early in the disease stupor, delirium, and a more or less profound unconsciousness mark the existence of an intoxication or general systemic infection.

In the septicæmic form it would seem that the infection has taken place through the intestinal, digestive, or respiratory passages, or has been secondary to the suppuration of a bubo. These cases are, as a rule, not as violent in their course as the other types, and furnish the larger portion of the small number of recoveries. The pneumonic form is at once the most insidious in its onset, the most difficult of diagnosis, and the most fatal in its results. It is usually ushered in by a pain in the side, which becomes more pronounced as the disease progresses; the respiration becomes difficult and embarrassed, and there is cough, with a tenacious, dark-colored, or bloody expectoration. It is through the examination of this expectoration that the diagnosis is most easily made, as, spread upon a slide, stained and examined under the microscope, the presence of the plague bacillus in large numbers may be thus tentatively established until cultural and other methods of studying the organism are concluded. The bacillus is not in pure culture, but is accompanied by diplococci, staphylococci, and streptococci, and in making the diagnosis by this method the property of the plague bacillus of completely decolorizing by the method of Gram must be borne in mind.

Post-mortem, the pneumonia is found to be generally lobular or disseminated in character, though it is sometimes lobar, sometimes involves a whole lung, or may, indeed, involve both lungs.

The general characteristic of the lesions of plague is a tendency to hemorrhages, either into the parenchyma of the spleen or kidneys, the subdural and arachnoid spaces, the spinal cord, or into the loose connective tissue of various regions of the body.

This tendency to hemorrhages would seem to be a manifestation of the peculiar properties of the toxins formed by the plague bacillus in the process of growth, as it has been observed alike in animals subjected to inoculations with the culture of the bacillus and its isolated toxins.

Among the sequelæ of the plague may be mentioned as most frequent, long-continued suppuration of glands, boils, and carbuncles, and eruptive diseases of the skin, and paralyses, sometimes of a particular set of muscles, sometimes of the lower and sometimes of the upper extremities. These manifestations may persist, or the affected muscles may gradually acquire strength and tone. These manifestations may be accounted for as

to the suppurations by the fact that the plague bacillue is usually accompanied by the organisms of suppuration; as to the paralyses, by the above-mentioned tendency to hemorrhages into the meninges and spinal cord.

SERUM THERAPY AND SERUM PROPHYLAXIS OF PLAGUE

It is necessary to draw a sharply defined line between the serum therapy and serum prophylaxis of any disease, and more particularly of plague. There is a wide difference between a preventive or prophylactic serum and an antitoxic or curative one: Nor in the case of plague does this seem to be one of degree, but one of kind. Any serum which is curative against plague is preventive' but unfortunately the reverse does not hold good. A serum perfectly prophylactic may be powerless to cure when once the disease has declared itself, and this should be borne in mind to avoid disappointment and to prevent possible discrediting of sero-therapeutic measures in general.

For the cure of plague there is at present but one accredited remedy, viz, the curative or antitoxic "antipest serum" of Yersin and Roux.

The preparation of the Yersin serum is, in brief, as follows: Horses are treated with progressively increasing doses of the tocsins of plague, prepared by subjecting virulent bouillon cultures of the *B. pestis* to a degree of heat which insures their destruction. These injections at first have a very profound effect upon the horse, and in time a certain immunity is conferred, and his blood serum is found to have a very decided effect in preventing the infection of animals when these are subjected to inoculations of cultures of the organism after the usual laboratory methods. Usually the process does not stop here, but is carried on to the production of true antipest serum, preventive and curative, whose further preparation is as follows: When reaction to the increasing doses of tocsin has practically ceased, toxins of the same nature are administered intraperitoneally and intravenously, and these are supplemented by the intravenous injection of toxins prepared with a special view to rendering soluble the tocsin which is enveloped in the dead bacterial body. If necessary, this is supplemented by the intravenous injection of live bouillon cultures, and bleedings are practiced and experiments made with the serum both against living, virulent cultures and against the precipitated toxins of the organism. When the serum has reached a point of strength when a dose of 1-10 c. c. will protect a mouse of 25 grams weight against living cultures and a three times mortal dose of toxin, the serum is considered to have acquired full antitoxic power, and is not only protective or prophylactic, but also antitoxic or curative.

THE VALUE OF YERSIN'S SERUM

The results from the treatment by the Yersin serum are gratifying. His first experiments were at Amoy in 1896, where he treated twenty-three cases with serum with a mortality of two, and these were desperate when first brought under observation, and should really not have been included for statistical purposes.

Subsequent experiments seem to justify the high hopes which had been built up as a result of this bold therapeutic departure, and the treatment of plague, both therapeutically and as a prophylactic measure by means of the serum has taken a firm hold in the minds of sanitarians and those whose duty it is to guard against invasions and extensions of the dreaded malady.

The results of treatment of the disease by the serum have been outlined above. Instances are not wanting which prove the prophylactic value of the agent. The following is cited as typical:

"The Bombay manager of the local branch of the Credit Lyonnais resided with his wife, children, and a numerous retinue of native servants in a dwelling in an infected portion of the city. His little daughter was stricken with the pest in a virulent form; was treated with the serum, and made a rapid and uneventful recovery. As a precautionary measure the whole family were subjected to inoculation, and the same measure of treatment was offered to the native domestics. Some accepted and escaped infection, while six who declined on the ground of religious scruples were all stricken, and five died. It seems that a more crucial test could not have been devised or a more triumphant vindication obtained."—Lecture by Roux at Pasteur Institute, 1897.

A French commission which has recently been investigating the disease in Oporto, Portugal, has determined that from investigations made upon mice, monkeys, and human beings the value of the "serum antipesteux" (Yersin's serum) is incontestable. In cases treated with the serum the mortality was only 14 per cent, while in those not so treated it was at least 70 per cent. These cases were of the pneumonic form, but it is believed that it will be found equally efficacious in those cases where the infection has taken place through the ordinary channels of infection of the skin and mucous membranes.

THE HAFKINE PROPHYLACTIC

Haffkine's prophylactic is prepared at the Pasteur Institute at Paris by simply planting the *B. pestis* on ordinary agar-agar, spread on dishes or other suitable vessels which expose a large surface. These cultures are allowed to mature for four days, and the growth upon each dish is then taken up in 100 c. c. of bouillon, free from peptone; then heated to 70° C. for one hour, and the product decanted or pipetted into sterile tubes, which are subsequently sealed in the flame. A dose of 5 c. c. of the Yersin serum will confer an immunity for about fifteen days, when it must be repeated. A dose of 1 c. c. of the Haffkine material will confer an immunity which is slower in being established, but which is of longer but undetermined duration. Statistics collected in British India show that the percentage of protection in those vaccinated once is about 85 per cent; in those twice or more vaccinated it is 95 to 100 per cent.

But the Haffkine material should not be used if the person has been definitely exposed to the plague or is thought to be in the incubative period; for if by chance he is already infected, the Haffkine injection may produce fatal results. Therefore the Haffkine material should be used as a preventive on persons before their exposure, while the Yersin treatment may be used either before or after exposure or while a person is suffering with the disease.¹

The rationale of this is not difficult of comprehension. An injection of

¹ The Haffkine material should not be used on suspects held in quarantine or on persons who have been definitely exposed to the plague, but is applicable to persons who are liable to be brought into contact with plague and before such possible contact, as quarantine officers and attendants, health officers and employes, and persons in a community where there is danger of the introduction and spread of the disease.

Haffkine prophylactic introduces into the economy a certain amount of toxin which in any event has to be counterbalanced or taken care of by the gradual production of an antitoxin. If before this elaboration the disease is given or acquired there is present the amount of toxin given plus the amount produced by the organism in the process of its growth in the economy, and the individual, man or animal, is overpowered.

The rationale of the Haffkine immunity is also a simple matter when the process is thought out. In the preparation of the Yersin serum the introduction of toxin into the cellular economy of the horse reacts, and in reacting produces antitoxic elements which are held in solution in the blood serum of the animal. These elements introduced into man or animals neutralize¹ the toxin introduced or elaborated by the pathogenic organism. In the Haffkine method the horse or other intermediary animal is dispensed with and the antitoxin is elaborated in the individual himself, which explains why the immunity is slower in being produced.

THE VALUE OF THE HAFFKINE PROPHYLACTIC

The following figures, taken from the British Medical Journal, show the results of the Haffkine inoculations, practiced in various villages in the Bombay presidency, during 1898:

	Number	Cases.	Deaths.
Inoculated.....	174	2	0
Noninoculated.....	172	12	6
Inoculated.....	147	3	0
Noninoculated.....	127	10	6
Inoculated.....	71	8	3
Noninoculated.....	64	27	20

These figures show that in addition to affording a very large percentage of protection against the disease, the mortality among those who had been inoculated was reduced 80 to 90 per cent, and the duration of the protection afforded was "several months."

An instance of the average mortality is given in the city of Hubli (British India) among those not inoculated, where it reached the figures of 657 per 1,000 of those attacked.

In the cities of Bombay and Mofussil the figures were as follows:

	Inoculated.	Cases.	Deaths.
Bombay.....	8,200	18	2
Mofussil.....	429	7	0
Noninoculated.....		26	24

These figures are for the Haffkine method of inoculation alone.

¹ The use of the word "neutralize" is not intended to denote adherence to the theory of Behring that toxin and antitoxin neutralize each other in the chemical sense of the effect of alkali upon acid. The word is used for the sake of convenience and clearness, and the weight of evidence would seem to be in favor of the theory of Roux and his school that the production of antitoxin is the result of cell stimulation.

Being thus able to cite instances in which the Haffkine and Yersin inoculations have been instrumental in preventing the disease, it is thought that it will be perfectly rational to lay down as a general principle that it will in the future be just as rational and scientific to practice preventive inoculation against the plague as it is now customary to vaccinate those exposed to the infection of smallpox with a view to preventing the spread of the disease.

The limit of the protection afforded by these preventive inoculations as to time is a matter which is involved in some doubt. In the Haffkine experiments which are quoted in this article the percentage of protection is very favorable, but the time is simply loosely stated as "several months."

In 1897 Roux recommended that the Yersin inoculations should be repeated at least every thirty-five to forty days. The reports of Simond would seem to show that they should be practiced even more frequently—every fourteen to twenty-one days. It should be distinctly borne in mind that these inoculations do not in any way take the place of general hygienic measures; they are simply an invaluable method of bridging over a crisis while other preventive measures are in progress.

ADMINISTRATION OF THE ANTIPEST SERUM (YERSIN)

General Technique.—The injection should be administered in the subcutaneous connective tissue of the flank, the abdomen, or the back, and should be practiced under the usual antiseptic precautions. The region where the remedy is to be injected should be washed with a solution of carbolic acid (five per cent or solution of mercuric chloride (1-1,000). A large antitoxin syringe should, if possible, be employed, and before using it should be nearly filled with cold water and then submerged in water which should be brought to a full boil and maintained at that temperature for fifteen minutes. After emptying, it should be allowed to cool before being filled with the serum, as heat has an injurious action on the remedy, and the syringe may be clogged by the coagulation of albumen. In the absence of an antitoxin syringe, an ordinary hypodermic syringe may be employed in its stead, care being taken as to the sterilization as above, and the syringe having been filled and emptied, the remainder of the dose determined upon may be administered without removing the needle, by detaching the syringe and filling its barrel the requisite number of times, the syringe being screwed or otherwise joined to the needle in situ. This obviates the necessity for multiple punctures, always disagreeable, and is an important point in the treatment of children.

(a) *Administration for prophylactic purposes.*—When a case of plague manifests itself in a house or on board ship, ten c. c. of the serum may be administered to all persons exposed to the contagion. The injection is not accompanied by any inconvenient or disagreeable after-effects. It should be repeated in ten days, in order to prolong the immunity, and in a badly infected locality the injection should be repeated several times.

(b) *Administration for curative purposes.*—The curative action of the serum is the more efficient the earlier in the disease the injection is practiced. Large doses should be administered, thirty to fifty c. c., rather than smaller doses successively administered. Under the influence of the serum the fever decreases and the swelling of the glands (the buboes) rapidly diminish. If this amelioration is not produced promptly, a second and even a third dose should be administered, until the fever and the general and local symptoms

disappear. This is important, for so long as the bubo remains, especially if suppuration supervenes, the patient is liable to secondary infections.

THE USE OF THE HAFKINE PROPHYLACTIC

This is for prophylactic purposes strictly, and should not be used in persons in whom the infection is probable or who have been definitely exposed to the infection. Under antiseptic precautions, as detailed above, a dose of one c. c. should be administered, and when the constitutional reaction has subsided the dose may, with advantage, be repeated. The duration of the immunity conferred is uncertain, but the inoculations should, it is believed, be repeated every thirty to forty days.

The preparation of antipest serum, according to the methods pursued by Yersin, and perfected by Roux, and the preparation of Haffkine prophylactic have been commenced in the hygienic laboratory of the United States Marine Hospital Service at Washington, D. C.

THE SPREAD OF PLAGUE FROM ONE COUNTRY TO ANOTHER

The spread of plague from one country to another presents many curious features, in marked dissimilarity to other epidemic contagious and infectious diseases. Continuity of territory, while the most general avenue, does not seem to be essential, but the disease proceeds from place to place by leaps and bounds, often skipping large intermediate tracts, but usually following the beaten tracks of commerce. There seems to be no doubt, in the present stage of our knowledge, that in spite of the limited virulence of the plague bacillus, its easy loss of virulence, and its other biological characteristics, it is sometimes capable of being conveyed in merchandise.

Another source of great danger is the existence of a type of the disease, described almost exclusively by English writers, and denominated by them the "ambulant" form of the disease. In this, owing to the introduction of an attenuated infection in individuals, the disease may go on to glandular enlargements, suppurations, and constitutional manifestations either of a very mild type or altogether lacking them. Suppurations, expectorations, possibly alvine discharges from such individuals disseminate the plague bacillus in number, but in probably a still attenuated form. Whether by passage through some of the domestic animals, whether by conditions of soil and habitat with which we are as yet unfortunately unacquainted, the organism suddenly acquires virulence, infects others in its new surroundings and an epidemic of plague of a virulent type results.

Further and careful study of the "ambulant" type of the disease is an important subject from an epidemiological point of view, and justifies the precautions recently taken at the quarantine station of requiring all passengers from a suspected plague territory to display their axillary and inguinal regions to the view of the inspecting officer.

In the spread of the disease from one area to another of the same territory there is at present no doubt that the ordinary domestic rat plays the most important role. The researches of Yersin proved that flies could carry living plague organisms in their intestinal canals, and that they deposited them still living in their dejecta. This is a possibly large source of dissemination of the disease, but is insignificant as compared with the role played by the rat. In a dissertation on the subject by a com-

mittee of the French "Academie de Medicine" in 1897 occurs the following statement (translated):

The plague, which is at first a disease of rats, becomes soon a disease of man. It is not unreasonable to think that a good prophylactic measure against plague would be the destruction of rats.

From numerous instance given by Simond in his article on "The propagation of the pest" (*Annales du l'Institut Pasteur*, October, 1898) the following instance is selected as typical, and showing the role played by the animal in disseminating infection:

In Bombay, on the 13th of January, 1898, a coachman entering his stable in the morning found the body of a rat, dead. He picked it up, carried it beyond the inclosure, and threw it away. On the 16th he was stricken with pest and died. A crusade was instituted against other rats in the buildings, and the premises were disinfected, with the result that no other cases occurred in the household.

But the question arises, How is the infection conveyed from rat to rat? for there is little controversy at this date that this very common domestic pest is largely responsible for the spread of perhaps the most terribly fatal diseases with which we are acquainted. Perhaps the rats, eating the dead bodies of their kind, as we know they do, become infected. It is possible, but numerous experiments by Roux, Batzaroff, Simond, and others all go to show that while infection may possibly be conveyed in this manner, it is at least a very uncertain factor. It is very possible that the fleas which infest rats, and which notoriously leave their bodies as soon as the cadavers become cold after death, may by their bites infect other rats, though the experiments of Nuttall would seem to show that the bites of insects play a very small role in the transmission of plague, except as furnishing a possible avenue of entrance for the bacillus. It is much more probable that the fleas or other insects having their habitat on animals deposit their dejecta, and in this way infect their bites. It is to be remembered, too, that a very small abrasion may furnish a point of entrance for the virus, and this too, may be made by the scratching consequent upon the irritation caused by the insect bites.

The following note by Roux, however, opens up a wide field for conjecture, and furnishes a most plausible explanation of the method of conveyance of infection from one animal to another. He says:

"Experiments on rats, guinea pigs and rabbits, made in conjunction with Dr. Batzaroff, have shown that it is easy to communicate fatal plague to these animals by depositing on their nasal mucous membrane, without in the least excoriating it, a little plague culture from agar-agar, or a little material from the spleen of a plague-stricken animal. We can thus transmit it as certainly as by sub-cutaneous injection. It would be interesting to know if the nasal mucous of pest-stricken rats is virulent. Should it be so, might it not play an important role in the infection of rats?" (Roux, note page 665, *Annales de l'Institut Pasteur*, October, 1898.)

Again, we have seen that in the pneumonic form of the disease the sputum contains a more or less pure culture of the plague bacillus. Experiments have shown that rats are susceptible to this form of plague, and their buccal and bronchial secretions could thus furnish abundant infectious material for the propagation of the disease to other rats and to other domestic animals.

PERIOD OF INCUBATION

In considering the transmission of the plague over long distances, which, as has before been said, usually closely follows the beaten route of commercial intercourse, there are two factors which present themselves, for, like other contagious and infectious diseases, plague would seem to be conveyed either by merchandise or by persons in the incubative period of the disease.

The period of incubation, therefore, demands attention. This has been variously stated as being from two to eleven or twelve days. Very careful observations have been made on this subject by Simond and by Haffkine, who practically agree in stating the incubatory period at from twelve to seventy-two hours. Simond says:

In our opinion, whenever it is necessary to take account of the duration of incubation, in order to take prophylactic measures, we should not give it a maximum duration of more than four days.

He cites the following observations, made in a detention camp in the Kerachee district, in which the period of detention seems to have been eleven days, though it is not specifically stated.

Total number of admissions..... 3,975
Of these there were stricken..... 115

These 115 cases were noted as follows:

First day (day of admission).....11	Seventh day..... 6
Second day.....15	Eighth day..... 5
Third day.....22	Ninth day..... 7
Fourth day.....19	Tenth day..... 5
Fifth day.....13	Eleventh day..... 2
Sixth day.....10	

Granted that all were infected on admission, it will be seen that, of the total number of cases given, 1.73 per cent occurred on the eleventh day; that 8.69 per cent occurred as late as the sixth day; that over 6 per cent occurred as late as the ninth day, or, in other words, that a fair proportion of the cases developed in a period which exceeds the average duration of a trans-Atlantic passage in these days of fast ships. This point has an important bearing on quarantine measures at ports of arrival, for it does not bear out the theory that the period of incubation is such that all cases which are to occur will occur on the voyage.

CAN THE INFECTION OF PLAGUE BE CONVEYED IN MERCHANDISE?

Personal effects are easily disinfected, but certain classes of merchandise are so difficult and expensive to disinfect as to render the measure impracticable. Generally speaking, it is now considered that new merchandise plays a comparatively small role in the conveyance of contagious diseases, yet when suspected it must be disinfected or forbidden entry until a time has elapsed covering the natural life of the bacillus.

This is an important point for the consideration of the quarantine or health officer. That it is not a new one is demonstrated by the fact that in 1846 the French Academy of Medicine appointed a commission to report upon the subject, and the findings of the commission were as follows:

"There is no proof that merchandise can transport plague outside of the epidemic foci," and the arguments upon which this conclusion was based were (translation): "In 1835 epidemic plague prevailed at Alexandria among the employes of all grades living in the warehouses of the Egyptian Government. A great quantity of bales of cotton, handled daily by laborers, were shipped to all the great ports of Europe from January to June—that is to say, during the period of the epidemic—without a single case of plague resulting. In 1835, 31,709 bales were carried to England, 33,812 to Marseilles, 424 to Leghorn, 150 to Holland, 32,263 to Trieste, 32 to various ports. These cotton bales, we repeat, did not convey plague to anyone although no precaution was taken to disinfect them. They were compressed before being put on board, and were then piled in as small a space as possible. The hatches were closed and the vessel left Alexandria. Of the sixteen English vessels loaded with cotton which left Alexandria from the beginning of January to the end of June, eight had plague on board, but the cotton loaded in these vessels was not more dangerous than that of noninfected vessels. We, close, gentlemen, what we have to say with regard to the transmissibility of plague by directing your attention to a fact of great importance, which is positively and officially recognized. Since 1720 not one of the porters employed at the lazaretto of Marseilles in loading and handling merchandise has contracted plague."

Sir John Simon brought this report to the attention of the privy council in England in 1875, and thus concluded his report:

"Under these circumstances, I evidently have no facts which would justify me in stating it to be necessary for the public safety that wool or other merchandise from Eastern places infected with plague should be excluded from this country."

This is a strong statement in the negative, but recently the idea has again gained ground that merchandise was a source of danger. The acting assistant surgeon of the United States Marine-Hospital Service at Yokohama, Japan, reports under date of November 15, 1899, as follows:

So far as investigation has progressed, no connection with the previous case at Hiroshima has been detected, or with the steamer which brought the latter from Formosa. It is found, however, that all the victims were engaged in handling, or came in contact with, a certain lot of cotton recently imported from Niuchang, China, where plague has been severely epidemic.

But again, the report of the Imperial German Plague Commission quoted elsewhere in this article shows that the viability of the plague bacillus outside of the human body is very short, and that its virulence is rapidly lost under conditions of heat, light, exposure to sun and air, etc.

This latter finding is directly in accord with every-day laboratory experience, where the greatest difficulty is found in keeping cultures of the plague bacillus in a virulent condition. Under ordinary conditions of laboratory growth, in the presence of uniform temperature, on favorable nutrient media, and kept from the influence of strong light, a culture of the plague bacillus virulent to rabbits will in two or three days so deteriorate that it is no longer pathogenic for the very susceptible mouse.

Passage through the bodies of animals, repeated at short intervals, seems to be necessary to preserve the virulence of the bacillus. These conditions removed, its viability is short, and it either perishes altogether or becomes a purely saprophytic organism. It would therefore seem justifiable, in the present state of our knowledge, to assert that the relative danger from merchandise as a carrier of infection is slight, and that the greatest danger is to be apprehended from mild cases of the disease, unrecognized, little dangerous in themselves to the person having it, but as capable of spreading virulent contagion as is mild varioloid of communicating and imparting a virulent, fatal type of smallpox.

With a view to preventing the spread of the plague from India into Europe, an international sanitary conference, called by the Italian Government, at the instance of the Austro-Hungarian Government, assembled at

Venice February 9, 1897, and adjourned sine die about March 7. The representatives from the United States were Consul-General Wallace S. Jones and Passed Asst. Surg. H. D. Geddings, United States Marine-Hospital Service, technical delegate. The direct interest that the United States has in the prevention of the spread of the disease into Europe may be seen from a consideration of the dangers which would threaten this country provided the disease should become epidemic in certain European seaports, especially those from which large numbers of emigrants embark for the United States. For example, there is a large emigration from Naples, and the vessels which bring immigrants from Naples have Marseilles as their port of original departure. Thus, the infection of either port would be a matter of serious concern, and it should be remembered that Marseilles is the great entrepot on the Mediterranean of commerce from the Orient.

SPECIAL FACTORS IN THE SPREAD OF THE DISEASE

There are two features of this disease which are matters for serious consideration, so far as the United States is concerned: One is the ambulant, or walking form, or pestis minor, in which the symptoms are mild, the patients not being confined to bed. They may be afflicted for a period of from ten to thirty days before the symptoms have developed which call attention to the disease, and it may then develop into the violent form. The other feature is the possibility of infected rats on a vessel, a matter requiring the keenest vigilance on the part of the quarantine officer to determine.

The rat is beyond a doubt largely responsible for the spread of plague from one area of an infected district to another, but it is entirely possible that he may also convey it to greater distances. The rat is notoriously a voyager, and those who have observed his habits have noted that at irregular but frequently repeated periods he shows decidedly migratory tendencies. The enormous number of rats which infest cargo vessels is a matter of common knowledge among those who deal with this class of vessels at our quarantine stations. There is on record an instance in which after the sulphur fumigation of a cargo steamer of about 3,500 tons there were removed from the holds of the ship sixteen ordinary deck buckets of dead rats. A moment's thought will show what a terrible mass of infectious material this ship would have furnished if the plague had ever been introduced aboard by a single plague-infected rat.

From the foregoing lines it may be readily understood how the malady may be transmitted from one country to another by travel and commerce, either overland or by sea. As with cholera, the chief element connected with its spread from India to other portions of Asia and into Europe and Africa are the religious pilgrimages. Pilgrims from infested districts visit the shrines, which are also visited by people from non-infested districts, who carry back with them the germs of the disease.

MARITIME QUARANTINE AGAINST PLAGUE

Although the quarantine regulations of the Treasury Department contained provisions relating to the plague, it was deemed expedient to make the following special regulations, which were cabled to Bombay, January, 1897:

**"QUARANTINE REGULATIONS TO BE OBSERVED AT FOREIGN PORTS AND
AT SEA**

"ART. IX. At all foreign ports and places infected, or suspected of being infected, with plague, the United States Quarantine Regulations, Treasury Department, 1894, relating to cholera, shall be observed with regard to vessels and cargoes bound to the United States. Passengers and crews of said vessels who have been exposed to the infection, or are liable to convey the disease, shall be detained a period of not less than fifteen days from the last possible exposure to infection, under the same regulations as those relating to cholera."

With regard to vaccination at the port of departure and en route of all emigrants as a preventive measure against smallpox, it is evident that this measure should be waived whenever the vessel, its personnel, or cargo comes from an infected port or district, inasmuch as the resulting abrasion will render the person more liable to the infection of plague, and, furthermore, the vaccination may complicate the diagnosis on arrival at quarantine as resulting frequently in enlarged axillary glands. In such cases the diagnosis would necessarily rest on microscopic examination of tissues or secretion. Vaccination, therefore, under the foregoing circumstances should be deferred until the immigrant has arrived and until after all possibility of plague infection.

**"QUARANTINE REGULATIONS TO BE OBSERVED AT PORTS AND ON THE
FRONTIERS OF THE UNITED STATES**

"ART. XIII. The regulations heretofore promulgated with regard to cholera shall be observed with regard to vessels, cargo, passengers, and crews infected, or suspected of being infected, with plague, but persons who have been exposed to the infection, or are liable to convey the disease, shall be detained for a period of not less than fifteen days from the last possible exposure to infection."

The quarantine methods of the United States are well adapted to meet emergencies, though the national laws should be strengthened. The law and regulations relate to foreign as well as to domestic ports and require every vessel leaving a foreign port for the United States to have a bill of health, signed by the consul, certifying that all the requirements have been complied with. The regulations for foreign ports are such as to insure the sanitary condition of the vessel, in cargo, and passengers before sailing.

In addition to the above, there is a complete and uniform system of quarantine for domestic ports. The regulations are explicit with regard to inspection before entry, removal, and treatment of the sick with contagious disease, the isolation of those who have been exposed to contagion, the disinfection of the vessel and any articles of cargo that may be infected, and, finally, with regard to vessels bringing immigrants, a notification to be sent to the proper State health authorities of the expected arrival within their jurisdiction of immigrants who have arrived on the infected vessels, even though all precautionary measures necessary at quarantine have been taken.

The government is well equipped with quarantine stations for the disinfection of infected vessels, and has besides several large stations where immigrants can be detained in barracks under observation, as at the Delaware Breakwater, at the mouth of Delaware Bay, and Fishermans Island

(entrance of Chesapeake Bay), [on the Atlantic coast, and Angel Island, San Francisco Bay, and Diamond Point, Washington, on the Pacific.

It seems impossible that the plague should ever again ravage the earth as in previous centuries. Modern quarantine is effective to a degree. Though old-fashioned and absurd as administered by some of the European countries and imperfectly executed in others, it nevertheless has proven, and will continue to prove, a powerful shield against this Asiatic invasion. Even should the disease spread to certain European countries, modern sanitation of cities, the knowledge of disinfectants and improved disinfecting appliances, and modern knowledge of the disease itself will doubtless enable it to be confined within reasonable limits.

NECESSITY OF EXTRAORDINARY CARE IN INSPECTION OF VESSELS AT DOMESTIC PORTS

The details of quarantine methods are set forth in the circular containing the most recent regulations, at the close of this article, but it is pertinent to here call attention to the necessity of great care in the quarantine inspection at domestic ports of vessels either coming from a plague-infected port or from a port which is itself not infected when the vessel brings passengers, members of the crew, stowaways, rags, or merchandise from an infected district.

When the vessel is from a port infected or suspected of being infected with the plague, the whole personnel of the vessel, including the crew and stowaways, should be subjected to removal of so much of their clothing as will allow of the most careful inspection of glandular regions, female inspectors being provided for female passengers and carefully instructed in their duties by the medical officer at the station. Special attention should be given to the ambulant, or walking cases, inasmuch as these present few outward symptoms to attract attention. In addition, careful search is to be made for the pneumonic type of the disease, and any severe pulmonic disease running a rapid course should arouse suspicion, and whether accompanied or not by glandular enlargement, should be subjected to a bacteriological examination of sputum.

PRINCIPLES OF TREATMENT AT QUARANTINE OF SHIPS INFECTED OR SUSPECTED OF INFECTION WITH PLAGUE

All ships arriving at a quarantine station may be divided into the following classes, viz.:

Iron ships, with cargo, without cargo; wooden ships, with cargo, without cargo; and in some particulars each class will demand separate consideration, while the same broad general principles are applicable to all.

These general principles have been so often discussed and are now so well known that a brief recapitulation of the ends to be obtained and the means of attaining them is all that is required.

The end to be obtained is, in brief, that the ship, her cargo, passengers, crew, and their effects shall each and every one of them be incapable of transmitting the disease quarantined against, and it is logical, therefore, to commence with the consideration of the treatment of the passengers and crew. These should be removed from the infected area or the area suspected of infection—viz., the ship—all passengers and as many of the crew as can be removed without jeopardizing the safety of the ship. If they are

sick, they should be placed at once in hospital, and those who have been specially exposed to infection should be carefully isolated and kept under the most rigorous observation. All, before entering the quarters destined to receive them, should be carefully bathed, clothed in sterile clothing, and not permitted to carry into the barracks or place of detention anything which has not been disinfected. If plague has occurred on the voyage, and if it is possible to procure the material, all should receive an immunizing dose of antipest serum of 5 to 10 c. c., which should be repeated at the end of ten to twelve days. All should be stripped before entering barracks and carefully examined to note the appearance of any glandular enlargements, which might escape the observation of the uninitiated and which might well be present in ambulant cases of the disease.

Those detained should be isolated in groups of a convenient number, and no intercommunication should be allowed among the groups. There should be a careful medical inspection twice daily, and any who may be found presenting suspicious symptoms at these inspections should be isolated pending determination of the nature of their ailment.

Any group among which plague may make its appearance should have all personal effects redisinfecting and should be kept under the strictest possible supervision.

Care should be exercised as to food and water supply. No food should be allowed in the barracks, and no washing of clothing should be permitted by the inmates, but all such laundry work should be performed by specially designated employees of the station, who should be instructed to be certain, as a matter of personal protection, that all clothing to be laundered is disinfected by some approved method prior to passing into their hands.

The detention should last fifteen days from the time of last possible exposure to infection, and after a final disinfection of the effects carried into the barracks, all groups among whom no outbreak of plague has occurred may be discharged from quarantine in free pratique.

If the ship has cargo a special condition has to be met. It is very essential that every chance of conveying infection through this channel should be eliminated, and more important still that every effort should be bent to the destruction and safe disposal of all species of vermin which usually infest cargo ships and which in the present state of our knowledge play such an important role in the dissemination of the disease under consideration. Cargoes of coffee in sacks, sugar in bags, and general merchandise can at least be subjected to a surface disinfection if some little foresight has been exercised in loading the ship with this end in view. This is effected by leaving under each hatch a shaft leading down to the very bottom of the ship, the sides of this shaft being built up of planks and timber to prevent the shifting of cargo. Through the shaft thus constructed the pipe from the sulphur furnace should be conducted, and by the combustion of an appropriate quantity of sulphur in the furnace the vacant spaces and the interstices of the cargo are filled with sulphur dioxide, which is allowed to remain in the tightly sealed hold for twenty-four to forty-eight hours. Should these shafts not have been left in loading, they should be formed by the removal of sufficient cargo to accomplish the desired end, the cargo removed being discharged on lighters. The discharge of the cargo should then be begun, it being placed on lighters and so stored as to admit

of the greatest possible exposure to sunlight and circulation of air possible. Every evening when work has been suspended for the day the sulphur fumigation should be repeated, in this way insuring that every particle of cargo removed during any given day has been subjected to a disinfection during the night preceding.

During the discharge of the cargo a careful watch should be kept for rats, dead or alive. If possible, a bacteriological investigation should be made of their bodies, to determine whether their death is due to plague infection or to sulphur asphyxiation, and in any event the bodies of the vermin should be most carefully handled and promptly burned.

The discharge of the cargo completed, it should be retained in quarantine upon the lighters, exposed to sun and air.

The ship being emptied, the ordinary methods of maritime sanitation should now be practiced with the greatest care. Sulphur fumigation of the empty holds will, in all probability, dispose of any rats which remain, and this should be followed by thorough mechanical cleansing, another sulphur fumigation, washing with the solution of bichloride of mercury, the steaming of all clothing, bedding, textiles, and fabrics, and the disinfection of all living apartments, either by the prescribed methods of sulphur or formaldehyde disinfection.

Should an iron ship without cargo arrive at quarantine, the methods just detailed to be taken subsequent to the discharge of the cargo will be fully applicable, and another problem presents itself for consideration, viz., the handling and disposal of ballast.

Following a custom which has been practiced at quarantine stations for many years, the hold, with the contained ballast, is subjected to a sulphur fumigation, after which the treatment depends on whether the ballast is to be immersed in deep water or left exposed. In the first case the ballast may simply be removed and dumped; in the second it must be disinfected by immersion in an acid solution of bichloride of mercury, 1:800 or 1:1,000. The ballast which is to remain in the ship must, however, be thoroughly disinfected by "dipping" in the mercuric solution, and then be trimmed as desired.

If the ballast is to be discharged into a fresh-water stream or in brackish water, it must be disinfected before such discharge. No ballast removed from a plague-infected or plague-suspected ship should be removed from a quarantine station.

The treatment of wooden ships with or without cargo is conducted on the same general principles as that of the iron ships, with the exception that the sulphur fumigation must always precede the bichloride washing and the exposure to the sulphur dioxide must be longer.

The reasons for this are, in the first place, purely physical: If the cracks and seams of a wooden vessel are sealed even by even a thin layer of fluid, the penetration of the gaseous disinfectant is prevented and the disinfection of the spaces between the two layers of the ship's planking is rendered impossible. The longer time demanded is purely in the interests of more perfect germicidal action by penetration of the gas into the wood, an end which takes from forty-eight to seventy-two hours to accomplish. Wooden vessels are usually more filthy than iron ones; therefore the mechanical cleansing

will present more difficulties, but these difficulties are of degree and not of kind.

A few points should be mentioned here which may have value in the management of actually infected ships. Cargo which is suspected of infection should, if possible, be handled with gloves or mittens, for if actually infected the abrasions caused by the handling of cargo and tackle would afford an easy entrance for specific organism. The dead bodies of rats should not be handled with the naked hands, but should be gathered by means of tongs, or the hands certainly protected by gloves or otherwise. Most important too is the disinfection of the spots where these dead rats are found. They should be disinfected by the application of a solution of carbolic acid, 1:20, or by a solution of mercuric chloride, 1:1,000, or, in the absence of both of these, by the liberal application of actually boiling water in large quantity. The bodies should be collected in one place and promptly burned in a special creamating apparatus, or, in the absence of this, in the furnace of the boilers.

Most important, however, in the opinion of the Marine-Hospital Bureau, is a careful watch for ambulant cases of the disease. It is admitted that there may be a certain minimal risk in merchandise, but it would seem that by far the larger and more important danger is in these mild and unrecognized types of the disease. Great caution should therefore be exercised to prevent their embarkation on any ship bound for the United States, and there should be a careful scrutiny of the persons of all passengers, cabin and steerage, arriving in the United States from an infected or suspected port or place or from a suspected locality, via a healthy port. This scrutiny should be rigid, and false ideas of modesty should not be permitted to interfere in the discharge of this important duty. In the case of female passengers or immigrants it might be necessary to employ female inspectors, but this is a detail which can be safely left to the judgment of the individual quarantine officer. The greatest vigilance is demanded, and in it alone will be found that safety which this continent has heretofore enjoyed from the ravages of this terrible malady.

In the absence of a sulphur furnace at any quarantine station, the disinfection of cargo required by the regulations may be accomplished in a fairly efficient manner by means of sulphur fumigation with pots. A portion of the cargo immediately under the hatches should be removed and laid aside for future desinfecting procedures. This will afford room for the introduction overnight of an ample quantity of sulphur in pots, which should be lighted and the hatches closed until the following morning. This should be repeated every night until the hold is emptied, and insures at least a partial surface desinfection of the cargo with is to be removed during the day.

MEASURES AGAINST PLAGUE ADOPTED BY THE FRENCH GOVERNMENT

With a view of showing some preventive and restrictive measures which have been inaugurated abroad, and for purposes of comparison with our own practice and regulations, the following partial translations of recent pamphlets received from the consulting committee of public hygiene, department of the interior of the French Republic, are here introduced.

The consulting committee of public health (ministry of the interior) of

the French Republic has announced the following proposition and formulated the following suggestions and rules for the prevention of the spread of the plague:

I. Rats and mice are very active agents in the propagation of the plague. When they are stricken they are not long in spreading the disease among the inhabitants of the places where they pass or where they live. The epidemic among these rodents precedes always by a few days the epidemic among men.

II. That therefore, at any price, it is necessary to rid ships and hospitals of their presence.

It is therefore necessary to use every care to prevent the access of rats and mice into hospitals, or to destroy them, if there, with the very greatest care. Therefore all openings should be protected by metal screens or other approved devices for preventing the entrance of the vermin; or should they have effected an entrance, they should be killed by some efficient rat poison, their bodies collected and burned, and the places where the bodies are discovered should be disinfected by some strong germicidal solution.

The same measure of precaution should be applied upon ships upon their voyage, viz, to prevent the access of rats to the vessel while she is lying at a pier and to destroy them effectively when their presence is discovered, carefully burning the bodies and disinfecting the localities where the bodies are found, as above.

Upon arrival the presence or absence of rats on board should receive the careful attention of the quarantine or health officer. If rats should be discovered, or if their bodies should be discovered, they should be subjected to bacteriological investigation, in order to establish the presence or absence of the *B. pestis*. In cases where this shall be discovered the ship shall be discharged, its cargo and the baggage and effects of the passengers and crew disinfected, and the entire ship subjected to sulphur fumigations and the bodies of rats carefully burned.

A.

The plague is an infectious disease caused by a specific bacillus discovered by Drs. Yersin and Kitasato.

B.

The forms of plague are: Plague with visible buboes, or bubonic plague; plague without visible buboes, or plague septicæmic in character from the beginning; pneumonic plague; and intestinal plague, which is very rare.

I.—BUBONIC PLAGUE

Bubonic plague begins by fever, nausea, pains in the head and limbs. Swelling of the glands of the groin, the axilla, or the neck soon shows itself. This swelling is very painful; if it remains diffuse, the general condition becomes more and more grave, with delirium and progressive enfeeblement of the heart's action. Death supervenes rapidly, because the plague bacillus has passed into the blood; the disease has become septicæmic.

In milder cases the swelling is limited and an abscess is formed. Suppuration of the glands is ordinarily followed by a marked amelioration, and patients whose glands suppurate may recover. It may happen, how-

ever, that the plague abscesses may be the point of departure of secondary infections with multiple and prolonged suppurations, which may lead to cachexia.

The appearance of buboes may be preceded by that of pustulus, around which the skin becomes violaceous and finally ulcerates (plague ulcers).

Some patients present swellings and suppurations of the glands without general constitutional symptoms, and who are nevertheless plague stricken. This benign form ought to be particularly guarded against, as it is often unrecognized, and persons stricken with it may easily propagate the disease. This form is called ambulant. The serum from the swollen glands, form pustules, the pus from buboes contain the plague bacilli, and bacteriological examination gives a rapid and precise diagnosis. These fluids should therefore always be collected for examination.

II.—PLAGUE, SEPTICÆMIC FROM THE BEGINNING

Sometimes no localized glandular swellings are noted, or there may be a slight increase of volume of various lymphatic glands, in spite of which the fever, delirium, and other symptoms of plague poisoning may be very intense. The disease is then septicæmic from the beginning, and kills the patient in a few hours.

III.—PNEUMONIC PLAGUE

Pneumonic plague begins most frequently by a chill, with vertigo, nausea, and pains in the head and limbs. The temperature is raised. The general symptoms precede the pulmonary signs, which may not show themselves for three or four days after the beginning of the disease.

Pulmonary symptoms.—Pain in the chest; dullness, more or less accentuated; crepitant and subcrepitant rales, frequent or sometimes incessant cough. The sputa, according to circumstances, are either abundant, fluid, serous, often foamy, and tinged red by blood, or viscid and prune juice colored. True spitting of blood may supervene.

Cause of the disease.—The vertigo of the commencing attack may disappear and consciousness be retained, elevated temperature, rapid pulse, tongue at first moist, then dry, and covered with a coating, cough and incessant expectoration, dyspnoea, delirium, petechiæ, hemorrhages from mucous surfaces, enfeeblement of the heart action cyanosis and death from the fourth to the eighth day, rarely more delayed.

Differential diagnosis.—Pneumonic plague is distinguished from ordinary pneumonia by the lack of harmony which exists at the beginning between the severity of the general condition and the condition of the lung as shown by physical signs.

Pneumonic plague may be confounded with the pneumonia with rapid course of influenza.

There is but one precise means of making a diagnosis, viz, to make a bacteriological examination of the sputum, which contains numerous plague bacilli.

It should be remembered that the plague bacilli do not exist in the sputum in pure culture, but are always associated with staphylococci, streptococci, and diplococci. It must be borne in mind that the plague bacilli are completely decolorized by the method of Gram; the other organisms mentioned are not so decolorized.

C

In countries threatened with the plague it is imperative that all febrile persons who show evidences of glandular enlargements should be submitted to bacteriological examination, as well as those who present symptoms of pulmonary troubles with grave general symptoms.

II.—TRANSMISSION OF THE PLAGUE

The germ of the plague is contained in the pus of buboes, abscesses, wounds, and sometimes in the products of expectoration; more rarely in the stools and urine of patients. It is found in the blood. It effects entrance especially by wounds, excoriations or crevices, and small lesions which often pass unrecognized.

It may be transported by parasites, fleas, etc., and especially by rats and mice.

Rats are often sick with the disease before men are attacked, and in certain epidemics a great mortality among rats has preceded by several days the first cases among human beings.

The germ of plague may be transmitted by the most diverse objects, as clothing, body linen, bedding, rags, wool, carpets, hair, untanned hides, etc. Food and drink may serve also as the intermediary of contagion.

The transmission may be effected by the respiration of dust, in which the germ of plague may be contained. In the pulmonary form the transmission is habitually effected from person to person by the sputum of patients, which contains the bacilli.

Transmission may also be effected to a distance by means of the intermediaries already cited—clothing, body linen, bedding, etc.—by convalescents, by patients with mild attacks (ambulant form), and by rats.

III.—COURSE TO BE PURSUED WITH REGARD TO AN INDIVIDUAL STRICKEN WITH PLAGUE OR SUSPECTED OF PLAGUE

As soon as a case of plague or one suspected of being plague comes under the observation of a physician, he should make declaration of the fact to the proper health authorities.

He should, if possible, communicate with the director of a bacteriological laboratory and ask for an investigation of the malady.

In large cities where such establishments exist he should apply at once for an examination, and in case of death he should make careful examination to see whether the bodies present glandular swellings or abscesses. In cases where they are found it would be well to remove from the body, with due precaution, some of the swollen glands or some of the pus of abscesses for bacteriological investigation.

In all cases where death has been caused by a pulmonary affection of unusually rapid course (simulating pneumonia, broncho-pneumonia, influenza, pulmonary congestion, etc.), they should endeavor to secure material for bacteriological investigation.

The glands, pus, or sputum enumerated above may be secured in a test tube, sealed, and securely packed for transmission to a laboratory.

IV.—ISOLATION AND DISINFECTION

A patient stricken with plague should be isolated.

The patient should be kept in a state of the utmost cleanliness.

The persons alone who are charged with his care should have access to him.

They should observe the following precautions:

To take neither food nor drink in the sick-room.

To never take food without washing the hands with soap and a disinfecting solution.

To frequently wash the face with a disinfecting solution.

To thoroughly air the sick-room several times a day.

To rinse the mouth from time to time, and always before eating, with a disinfecting solution.

In the sick-room the following precautions should be observed:

Curtains, carpets, rugs, and all furniture which is not necessary should be removed.

The bed is to be placed in the middle of the floor. It should be washed with a disinfecting solution. There should be no dust, dirt, nor parasites in the corners of the room. Cloths, coverings, and mattresses are to be disinfected by steam or boiling at the conclusion of the case, or as often as they accumulate.

The floor of the room or apartment should be washed or mopped daily with a disinfecting solution.

DISINFECTION

The disinfectants principally recommended are corrosive sublimate, carbolic acid, sulphate of copper; chloride of lime, freshly prepared; milk of lime,¹ freshly prepared.

The solution of corrosive sublimate will be employed in a strength of one per 1,000, with the addition of two parts per 1,000 of common salt or hydrochloric acid.

Carbolic acid will be employed in a strength of five per 100.

Solutions of sulphate of copper and chloride of lime will be in a strength of five per 100—i. e., fifty grams per liter—and milk of lime twenty per 100, or 200 per liter.

Washing of the face and hands, use the sublimate solution, 1-1,000.

Rinsing of the mouth, use a solution of hydrochloric acid, 4-1,000, or four grams of acid to one liter of water.

Dejections.—All dejections of patients (vomited matter, fecal matter, etc.) are to be immediately disinfected with either the solution of sulphate of copper, chloride of lime, or the milk of lime. The milk of lime is particularly recommended if freshly prepared.

A small quantity of one of these solutions should be placed in the bedpan or other vessel before being used by the patient.

If these dejecta are thrown into water-closets or latrines, these should be disinfected by one of the solutions at least once in each day.

¹A very active milk of lime is prepared as follows: Take lime of a good quality and caustic, and cause it to crumble by moistening it little by little with half its weight of water. When crumbling is effected, place the powder in a container perfectly dry and carefully stoppered. As a kilogram of lime which has absorbed 500 grams of water in order to slake it has acquired a volume of two liters and 200 cubic centimeters, it is sufficient to dilute it with four liters and 400 cubic centimeters of water, which will give a solution of twenty per 100.

Dressings.—The dressings of buboes and ulcers should be promptly burned.

Body linen.—Soiled body linen may be treated by one of two methods—

(a) By being placed in a disinfecting apparatus. Contaminated clothing not stained with blood, pus, or fecal matter may be placed directly in the apparatus; stained linen should remain for an hour in a corrosive-sublimate or carbolic acid solution. Failure to exercise this precaution will result in indelibly fixing the stains after steaming.

(b) A simple, economical, and convenient method of disinfection consists in immersing the linen to be disinfected in a carbolic or sublimate solution for an hour. None of the articles enumerated above should be washed in the running water of a stream.

Clothing.—The clothing of patients and nurses is disinfected by steam or by immersion in boiling water for one-half hour.

If for any reason both of these methods are inapplicable, the clothing may be disinfected by sulphur dioxide by the method to be subsequently described.

Furniture, bedding, mattresses, etc.—Furniture should be washed or disinfected by one of the disinfecting solutions; bedding and mattresses by steam or by immersion in boiling water, or, failing one of these methods, should be destroyed by fire.

Corpses should at once be wrapped in a sheet wet in one of the strong disinfecting solutions, without preliminary washings, or inclosed in an airtight coffin, surrounded by a layer of sawdust wet with one of the disinfecting solutions, to prevent the filtration of fluids. They should be at once interred, preferably surrounded by caustic lime.

PERSONAL HYGIENE

The purity of the water supply should be watched with great care.

In cases of epidemics, drink boiled water only.

Water from surface wells capable of contamination is to be forbidden, and bakers should be prohibited from using water from such wells in the making of their bread.

In the event of the outbreak of a case of plague, the health authorities should be at once notified.

The patient should be promptly isolated, and in the event of the occurrence of a case in a habitation occupied by several families, the patient should be removed to a hospital in a special ambulance.

PUBLIC HYGIENE

All causes of unhealthfulness which may prepare the soil for the invasion of epidemics ought to be eliminated when it is a question of the possible importation of plague.

Thus, the rules of general hygiene, applicable at all times, should be most rigorously observed in times of plague, especially in all which concerns—

The destruction of rats and other rodent animals.

The congregations of individuals, as fairs, celebrations, and pilgrimages.

The surveillance and supervision of markets.

The cleanliness of the soil.

The regular removal of garbage.

The cleanliness of habitations.

The particular supervision of places, workshops, forges, etc., intended for occupancy by the laboring and industrial classes.

The cleaning and regular disinfection of water-closets, public and private.

Supervision and disinfection of latrines and cesspools.

The care and cleaning of gutters, etc.

Administrative care should also be brought to bear to improve the sanitary condition of notoriously unsanitary quarters and dwellings.

V.—TREATMENT OF PLAGUE BY ANTIPEST SERUM

The sero-therapeutic measures to be taken in cases of declared plague are of two kinds. They deal on the one hand with the patients, and on the other with those who have nursed them, and with those who have come into contact with persons thus exposed. The measures are therefore curatives and preventive.

I. CURATIVE TREATMENT

The patient having been informed of the nature of his disease, it will be recommended to him to receive a dose of from 20 to 40 c. c. of the anti-plague serum, according to the gravity of his case. Another injection of 20 c. c. should be given on the following day, and still another on the day following if deemed necessary. The technique of these injections will be the same as those of the diphtheria antitoxin. The open buboes will be dressed antiseptically, especially with gauze wet with a 1 to 1,000 solution or corrosive sublimate.

In addition to the sero-therapeutic measures, remedies which aid in supporting the strength of the patient, such as appropriate food, alcoholics, heart stimulants, etc., may be exhibited with advantage.

II. PREVENTIVE TREATMENT

The attention of those who nurse or otherwise care for patients suffering with plague should be called to the foregoing suggestions as to personal hygiene and the rules for those who act as nurses or those who have inadvertently been exposed to the danger of infection. These persons should also be informed that it would be a decided advantage to them to submit to an injection of 5 c. c. of antiplague serum, an injection which may advantageously be renewed in the case of nurses every ten to twelve days.

MEASURES TO BE ADOPTED AT BREMEN, GERMANY, FOR THE PURPOSE OF COMBATING PLAGUE

[From United States Vice-Consul G. W. Murphy.]

[Translation from the Weser Zeitung of November 25, 1899.]

The sanitary officials at Bremen have submitted a report concerning precautionary measures for combating the danger from bubonic plague. The outbreak of the plague in Portugal and in certain ports of England and Austria make it necessary to take steps to prevent the introduction of the disease at Bremen ports and to meet the possibility that plague may be brought in ships to the Weser River. A conference has been held in

the imperial sanitary department at Berlin, at which the director of the Bremen Bacteriological Institute was present, and the matter has been very carefully considered by the sanitary officials and a committee consisting of medical authorities, harbor officials, and ship owners. As a result the sanitary officials have made a report and requested appropriations as follows:

1. In addition to the director already empowered to make bacteriological investigations of cases of plague, a number of local bacteriologists must receive further instruction either in the Bacteriological Institute or in the imperial sanitary department at Berlin. To cover traveling expenses, etc., including the cost of sending a physician to Bremerhaven, a sum of 1,600 marks (\$380) is needed.

2. Rooms must be fitted up specially for the purpose in the Bacteriological Institute. Estimated cost, 1,700 marks (\$405).

3. If cases of plague occur at Bremerhaven, a branch laboratorium must be established there under the charge of a physician trained in bacteriology. A room in the quarantine hospital can be fitted up for this purpose at an expense of 350 marks (\$83).

4. For perfecting arrangements for bacteriological plague investigations various articles are needed which will cost 2,480 marks (\$690).

5. Recent investigations prove that rats and other vermin are the principal transmitters of the plague. Owing to the impossibility of preventing rats coming on board vessels at foreign ports and subsequently escaping to the land, the only defense against the danger which threatens us is to exterminate these animals as far as possible. Vessels engaged in traffic between the Weser and ports where the existence of plague is suspected should be supplied with cats. Poison should also be used, and such ships should be well smoked after the removal of the cargo. On shore the rats must be fought with cats and rat-catching dogs. Rewards must also be offered for the delivery of dead rats. In order to encourage port watchmen and other harbor employes to keep rat-catching dogs, a premium of 30 marks (\$7.50) per annum should be allowed to the owner of each such dog, the total number at Bremen and Bremerhaven not to exceed twenty-five. With this allowance port employes will be willing to keep dogs and pay the dog tax.

In addition to the 750 marks (\$187) needed for this purpose, 2,000 marks (\$470) should be appropriated for paying a premium of 5 pfennigs (1¼ cents) for each dead rat delivered. The dead bodies can be disposed of in the ovens of the gas works and in the central heaters of the ports. The possibility that the premiums may encourage the bringing in of dead rats from other places can not be avoided. Another means for getting rid of rats is to sulphurize the sewers in Bremen and to flood with river water those at Bremerhaven. Both of these plans are being considered. Owners of warehouses and barns near the ports are urged in their own interest to do their utmost to destroy the rats nesting therein. Furthermore, they are required, as are all port employes, to send to the Bacteriological Institute all rats found dead without visible wounds, in order that they may be examined for traces of plague. Consideration is now being given to the question as to whether and when this requirement should be extended to the public generally, as has already been done at Hamburg. The question as to whether a general destruction of rats by means of poison should be resorted to is also

being considered. For various reasons a decision has not yet been reached on either of these points.

6. Cases of plague which may occur at Bremen ports will be strictly isolated. For this purpose a portion of the cholera barracks at Bremen and part of the quarantine station in Bremerhaven will be used. They will be absolutely secured against the entrance and exit of rats, and the admission of unauthorized persons will be forbidden. For making these necessary preparations a sum of 14,080 marks (\$3,450) is necessary.

REPORT FROM YOKOHAMA, JAPAN—PLAGUE AT KOBE AND OSAKA

YOKOHAMA, JAPAN, November 24, 1899.

SIR: Under dates of November 15th and 16th I reported one case of plague as having occurred at Hiroshima on the 5th, and the outbreak of the same disease at Kobe to the extent of five cases. Since last writing, so far as I have been able to learn, no second case has occurred at Hiroshima, and but three more undoubted instances of the malady have been met with at Kobe, making eight in all at the latter place, one each on November 7, 9, 11, 12, 13, 15, 16, and 17, all attacked having died.

At Osaka, a very large manufacturing city some thirty miles from Kobe, on the 20th two little girls were seized with plague after a visit of one of them to a cotton-mill where old cotton, suspected to be of the lot from Niuchwang referred to in my letter of the 15th, was being worked up. Both of these girls, sisters, are dead. This makes ten cases in all to the present date.

Many suspected cases have been reported from Kobe and its neighborhood which, under observation, have been found to be of other disease.

The Government has taken very active measures, briefly as follows:

(1) Professor Kitasato, with several expert assistants, was sent to Kobe at the news of the first case. He, intrusted with full powers, has called to him from various parts of the country a large number of physicians more or less trained by himself, and forty or fifty of these have already arrived in the epidemic district.

(2) A thorough examination of all persons well or ill who can possibly be supposed to have been exposed to infection is being made in Kobe and its neighborhood, as well as at Osaka.

(3) A careful examination is made of all passengers leaving Kobe or Osaka, either by steamer or railway, before embarkation, and, at Kobe, a locally prominent English medical man is employed for this work in association with the Japanese doctors.

(4) Thorough examination of passengers by rail is also made at several points on each of the different railways connecting with both Kobe and Osaka, north and south of these cities.

(5) A general cleaning and disinfecting of all cities and towns, not only inside of but beyond the present area of the epidemic, is being carried out under the superintendence of the police, and an energetic campaign against the pathogenic rat has been inaugurated in compliance with the published advice of Professor Kitasato and other experts.

(6) The laws of marine quarantine are being applied with almost excessive

stringency, or what would seem excessive were the personnel of the quarantine force of higher and more experienced character.

At present it looks as though the efforts for the suppression of the epidemic may be successful, though it must not be forgotten that cold weather is just beginning and is, probably, most unfavorable to the development of the disease. It is hoped that the measures taken may be so thorough as not only to stamp out the present outbreak, but to afford security against its renewal next spring.

In connection with the apparent origin of the disease from old cotton imported from a plague center, I would add that all materials of this class are now destroyed wherever found, if of Chinese origin, in connection with the cleansing operations now being carried out.

In 1894, when upon myself, as a member of the imperial board of health, happened to fall the chief responsibility for preparing special rules and regulations to avoid the importation of plague from Hongkong, where it had just broken out, I stringently prohibited the admission of rags, old cotton, or old clothing, among other things, and put the period of quarantine for plague at nine days. Later, after the study of the disease made by Professors Kitasato and Awoyama, the regulations were changed and these prohibitions ceased to be effective, with what disastrous results is now shown; while the period of detention was reduced to seven days—in my opinion, another great mistake.

In accordance with your cable dispatch of the 16th instant, I immediately appointed as acting sanitary inspector, U. S. M. H. S., at Kobe, Dr. J. Bucknill Fowler, the only available man, and fortunately a very good one. He has accepted the appointment, I have instructed him to the best of my ability, and he has entered upon his duties.

As I understand this appointment to be one of emergency only, and so, it is to be hoped, temporary, I shall be glad to have instructions as to the conditions which should govern the period of Dr. Fowler's service,

Respectfully,

STUART ELDRIDGE, M. D.,
Acting Assistant Surgeon, U. S. M. H. S.,
Sanitary Inspector, Yokohama.

The SURGEON-GENERAL,
U. S. Marine-Hospital Service.

QUARANTINE REGULATIONS OF THE UNITED STATES RELATING TO PLAGUE.

CIRCULAR

[1900—Department Circular No. 6.]

TREASURY DEPARTMENT,

OFFICE SUPERVISING SURGEON-GENERAL MARINE-HOSPITAL SERVICE,

WASHINGTON, D. C., January 16, 1900.

To United States consular officers, masters and owners of vessels, national, State, and local quarantine officers, and others:

The following additions to the Quarantine Regulations of the United States, revised edition November 13th, 1899, are hereby promulgated for your information and guidance:

ADDITIONS TO REGULATIONS TO BE OBSERVED AT FOREIGN PORTS AND AT SEA

ARTICLE V

PAR. 18. Passengers should not be vaccinated at nor en route from ports or places infected with plague. Such vaccination increases the liability to plague infection and, by inducing fever and swollen glands, tends to confuse diagnosis at the port of arrival. This operation must be performed at the port of arrival and just prior to release from quarantine.

ARTICLE IX

PAR. 2. Baggage labeled and sealed by the consul or medical officer of the Marine-Hospital Service at a non-infected city may be admitted without disinfection, even though shipped through an infected port or locality, provided it arrives with the seal unbroken. Such baggage should be accompanied by a certificate of origin and non-exposure to infection.

PAR. 3. Passengers coming from an infected or suspected locality and desiring to take passage at a non-infected port should be held fifteen days under observation before being allowed to embark, otherwise the ship and all on board will be considered by the quarantine officer at the port of arrival in the United States as coming from an infected port. Any baggage from such infected or suspected localities, destined from shipment through a non-infected port, must be disinfected prior to shipment.

PAR. 4. In a port where plague prevails the vessel should not tie up to the dock. No lines should be passed to the shore that might permit rats on board. Passengers and cargo should be lightered, the crew not be allowed ashore, and personal communication from shore to vessel shall be under medical supervision. A statement to this effect from a medical officer of the Marine-Hospital service will have weight with the quarantine officer at the port of arrival in determining the question of disinfection and time of detention.

PAR. 5. Mammalian animals, such as dogs, cats, monkeys, mice, etc., which not infrequently accompany passengers as pets, should not be shipped from a plague infected or suspected port or place.

ADDITIONS TO REGULATIONS TO BE OBSERVED AT DOMESTIC PORTS

ARTICLE I

PAR. 8. *Inspection for plague.*—(a) In the case of vessels infected or suspected of being infected with plague, place vessel in quarantine in anchorage sufficiently remote from the nearest land or other vessel to prevent the escape of rats by swimming.

(b) Pilots, customs officials, agents of vessels, or others who go aboard vessel may be deemed and be treated as a part of the personnel of the vessel. Such persons shall be detained in quarantine a sufficient time to cover the period of incubation of the disease, if in the opinion of the quarantine officer said persons have been exposed to infection, and their dunnage, if any, shall be disinfected.

(c) In inspecting infected or suspected vessels the personnel of the vessel shall be inspected after the removal of all clothing which will interfere with a thorough examination of all glandular regions, including axillary, inguinal, and cervical.

(d) Female inspectors should be provided for inspection of female personnel. They should be instructed by the quarantine officer in the general symptomatology and recognition of the disease, but final decision is to be made by the quarantine officer.

(e) Special attention shall be given to the detection of ambulant or walking cases, which are a source of great danger and apt to be overlooked, because they present few objective signs to attract attention.

(f) Special attention should be directed to the pneumonic type of the disease. Any person presenting pulmonic symptoms of rapid course, with or without glandular enlargement, should be the subject of special inquiry and, if possible, of bacteriological examination.

(g) In suspected cases specimens of pus, sputum or the contents of lymphatic glands may be sent to the hygienic laboratory of the Marine-Hospital Service at Washington for examination, under the precautions prescribed by the postal regulations of the United States.

(h) The quarantine officer at the port of entry will carefully examine the ship's manifest of cargo for household goods, bedding, secondhand articles, personal baggage, corpses, rags, and articles apt to carry infection. Any articles believed by the quarantine officer to be infected must be disinfected in accordance with the quarantine regulations of the United States.

ARTICLE XIV.—TREATMENT OF VESSELS SUSPECTED OF PLAGUE

PAR. 2. If a vessel has been disinfected at the port of departure and the personnel bathed and their body clothing and baggage disinfected by a commissioned medical officer of the

Marine-Hospital Service, where proper facilities for such work exist, and in all other respects has complied with the United States Treasury regulations, and if no suspicious sickness has occurred enroute, such vessel may, in the discretion of the quarantine officer, have the time of the voyage deducted from the period of detention.

PAR. 4. No person from an infected or suspected port or place shall be admitted into the United States until a total period of fifteen days shall have elapsed under observation either at the port of departure, at sea, or at port of arrival, excepting as hereinafter provided.

PAR. 5. A first-cabin passenger, bearing the certificate of an officer of the Marine-Hospital Service certifying to non-exposure to the infection of plague for the fifteen days immediately preceding embarkation, may be admitted to entry without detention, provided, in the opinion of the quarantine officer at the port of arrival, he has not been exposed enroute to persons or things presumably infected.

PAR. 6. All passengers, excepting the first-cabin passengers, shall be bathed, and body clothing disinfected before landing. Similar measures shall be taken with the crew and their effects if the quarantine officer believes the crew has been exposed to infection.

PAR. 7. All baggage from infected places should be disinfected, either at the port of departure or entrance, in full accordance with the United States quarantine regulations. When disinfected at the port of departure, the containers shall be sealed and ticketed with a yellow "disinfected" label, signed by a medical officer of the Marine-Hospital Service at the port of departure; and if seals and labels are intact at port of arrival, such packages may, in his discretion, be passed by the quarantine officer at the port of arrival, without further disinfection. Hand baggage and baggage opened or used on the voyage must be disinfected on arrival. In no case shall soiled body linen be admitted without disinfection.

PAR. 8. A vessel from a plague infected or suspected port, carrying passengers but no ship's surgeon may, in the discretion of the quarantine officer, be quarantined with all on board for the full fifteen days from the completion of disinfection. (See note.)

PAR. 9. A vessel from a plague infected or suspected port, arriving with fewer persons on board than are accounted for on the bill of health, may, in the discretion of the quarantine officer, be considered as an infected vessel.

PAR. 10. Vessels suspected of plague shall be disinfected in whole or in part, in the discretion of the quarantine officer, and said disinfection shall be in accordance with the provisions of Article XVI.

ARTICLE XV.—TREATMENT OF PLAGUE-INFECTED VESSELS

PAR. 1. Remove all passengers from the vessel and all of the crew save those necessary to care for her. Place the sick, if any, in hospital, and isolate those specially suspected. Segregate the remainder in small groups, wherever facilities for such segregation exist.

PAR. 2. Persons with abrasions or open sores should have them protected with proper dressings before being permitted to handle persons or articles believed to be infected with plague.

PAR. 3. *Preliminary disinfection.*—After removal of the personnel a preliminary disinfection of all accessible parts of the vessel must be performed with sulphur dioxide. This preliminary disinfection should be started in the morning in order that guards may be placed on deck and in small boats around the vessel to detect and destroy any escaping rats.

PAR. 4. The water supply must be changed without delay, the casks or tanks disinfected by steam or 10 per cent solution of potassium permanganate, and, after thorough rinsing, refilled from a source of undoubted purity, or the water supplied must have been recently boiled. Some water tanks are not readily inspected and cleansed on account of their inaccessibility; these may be rendered safe by leading a steam pipe into them and boiling the water in situ.

PAR. 5. Nothing shall be thrown overboard from the vessel, not even deck sweepings. Such material shall be burned in the furnace or in a place specially designated, but not in the galley.

PAR. 6. Plague-infected vessels shall be disinfected in accordance with Article XVI.

PAR. 7. *Detention of personnel.*—(a) If practicable, antipeste serum should be used as a preventive measure on all the personnel of any vessel arriving with a history of sickness of a suspicious character on board during the voyage.

(b) The personnel of vessels shall be detained under observation fifteen days from the last possible exposure to infection.

(c) The people detained shall be inspected by the physician twice daily, and be under his constant surveillance, and no intercourse will be allowed between the different groups while in quarantine.

(d) No direct communication shall be allowed between any person detained in quarantine and anyone not in quarantine, except through the quarantine officer.

(e) The water and food supply shall be strictly guarded to prevent contamination, and issued to each group separately.

(f) Cleanliness of quarters and of persons shall be enjoined and enforced daily. Disinfection shall be used where there is any possibility of infection.

(g) Water-closets, urinals, privies, or troughs shall be provided, and their contents disinfected before they are discharged.

(h) In any group in which plague appears the sick shall be immediately isolated in hospital, and the remaining persons in the group shall be bathed and their effects disinfected, then removed to other quarters, if possible, and the compartment disinfected.

(i) No convalescent from plague shall be discharged from quarantine until after a sufficient time has elapsed to insure his freedom from infection, to be determined by bacteriological examination.

(j) The body of no person dead of plague shall be allowed to pass through quarantine. The body should be cremated, if practicable; if not, it should be wrapped without preliminary washing in a sheet saturated with a solution of bichloride of mercury, 1 to 500, surrounded in the coffin by twice the body weight of caustic lime and buried.

(l) Mammalian animals, such as dogs, cats, monkeys, mice, etc., which not infrequently accompany passengers as pets, should not be shipped from a plague infected or suspected port or place. Should, however, such arrive, they shall be held in quarantine at least fifteen days.

ARTICLE XVI.—DISINFECTION OF VESSELS INFECTED OR SUSPECTED OF BEING INFECTED WITH PLAGUE.

PAR. 1. *Holds of iron vessels*.—(a) With cargo: By twenty-four hours' exposure to sulphur dioxide, 10 per cent per volume strength, generated by an approved furnace, or forty-eight hours' exposure to 5 per cent per volume strength, generated by pots.

(b) Where cases of plague or death from the same have occurred on board, or where there have been deaths presumably from plague among the rats on a vessel, the cargo shall be lightered, in order to complete the disinfection of the vessel and facilitate the removal of all rats and other vermin.

This same procedure may be required by the quarantine officer whenever, in his judgment, the vessel or cargo is infected.

(c) Where it can be procured in sufficient quantity, liquefied sulphur dioxide may be used in the disinfection of cargoes, holds, and living apartments, it being borne in mind that it will be necessary to employ two (2) pounds of this material in lieu of one (1) pound of sulphur where indicated in the above regulations.

(d) No person should be allowed on the vessel or around the cargo with bare feet, and the use of proper precaution in handling dead vermin is advised.

(e) Without cargo: After the preliminary disinfection provided for in Article XV, paragraph 3, followed by mechanical cleansing, the hold must be thoroughly washed with a solution of bichloride of mercury, 1 to 800, applied under pressure to all surfaces by means of a hose, or disinfected by sulphur dioxide, 10 per cent per volume strength for twenty-four hours, or 5 per cent per volume strength for forty-eight hours.

(f) The water ballast of a vessel coming from infected or suspected ports should be discharged at sea, or if discharged in fresh or brackish water must be previously disinfected, the tanks to be flushed and refilled with sea water or disinfected.

PAR. 2. *Holds of wooden vessels*.—For a wooden vessel the treatment is the same as for iron vessels, except that the exposure of the hold to sulphur dioxide, 10 per cent per volume strength, must precede the washing with bichloride, and this exposure must be forty-eight hours in wooden vessels without cargo; or if only 5 per cent per volume strength sulphur dioxide is obtainable, the exposure must be seventy-two hours.

PAR. 3. All solid ballast on vessels infected, or suspected of being infected, with plague to be discharged or disinfected previous to disinfection of hold; all such ballast discharged in fresh water to be disinfected by saturation with, or immersion in, a solution of bichloride of mercury, 1 to 800.

PAR. 4. Clear, hard, cross-grained rock may be permitted to remain on board, but only after disinfection by immersion in a solution, 1 to 800, of bichloride of mercury. Ballast removed from vessels infected, or suspected of being infected, with plague, must not be taken from the quarantine station.

PAR. 5. Bilges shall be cleansed and disinfected in the manner provided for water tanks, Article XV, paragraph 4.

PAR. 6. *Living compartments of all classes of vessels*.—(a) The preliminary disinfection shall be done with sulphur dioxide, and not with formaldehyde, on account of the greater potency of the former against animal life.

(b) After this preliminary disinfection, remove bedding, hangings, carpets, clothing, and textiles for disinfection by steam or boiling or other methods prescribed by United States Quarantine Regulations. Subsequently the compartments themselves, with the non-removable fabrics therein, shall be disinfected in accordance with the United States Quarantine Regulations.

PAR. 7. *Personal effects*.—Clothing, bedding, and other such articles shall be disinfected in accordance with the provisions of Articles V and VIII, United States Quarantine Regulations.

PAR. 8. After the cargo has been discharged, the vessel must be submitted to a disinfection of all parts simultaneously by sulphur dioxide gas of 5 per cent per volume strength for not less than twenty-four hours, in order to insure destruction of all animal life aboard. The remains of all rats and vermin should be gathered and burned, and the places where gathered subsequently disinfected. Rats must not be handled with bare hands.

PAR. 9. After final disinfection, as provided in paragraph 8, the vessel must be kept under observation a sufficient length of time to satisfy the quarantine officer that the ship is freed from all rats and vermin.

WALTER WYMAN,

Supervising Surgeon-General, Marine-Hospital Service.

Approved:

L. J. GAGE, *Secretary.*

NOTE.—Navigation laws of the United States (sec. 5, act August 2, 1882):

* * * "Every steamship or other vessel carrying or bringing emigrant passengers or passengers other than cabin passengers, exceeding fifty in number, shall carry a duly qualified and competent surgeon or medical practitioner, who shall be rated as such in the ship's articles, and who shall be provided with surgical instruments, medical comforts, and medicines proper and necessary for diseases and accidents incident to sea voyages, and for the proper medical treatment of such passengers during the voyage, and with such articles of food and nourishment as may be proper and necessary for preserving the health of infants and young children; and the services of such surgeon or medical practitioner shall be promptly given, in any case of sickness or disease, to any of the passengers, or to any infant or young child of any such passengers, who may need his services. For a violation of either of the provisions of this section the master of the vessel shall be liable to a penalty not exceeding two hundred and fifty dollars."

Dr. M. J. Rosenau, Passed Assistant Surgeon, Director Hygienic Laboratory, Marine-Hospital Service, conducted a large number of experiments upon the viability of the *bacillus pestis*, an interesting report of which has been published by the United States Treasury Department, through the Marine-Hospital Service. The report is quite exhaustive and covers forty-four (44) pages.

We present herewith his conclusions:

(1) The *bacillus pestis* is not a frail organism. It resembles the hemorrhagic septicaemic group or the *cocco-bacilli* as far as its viability is concerned.

(2) Temperature is the most important factor in the viability of the plague bacillus. It keeps alive in the cold, under nineteen degrees C., a very long time. It dies quickly, especially when dried, at the body temperature, thirty-seven degrees C.

(3) Moisture favors the life of the *bacillus pestis*. It usually dies in a few days when dry, even in the presence of albuminous matter, provided the temperature is above thirty degrees C. It may keep alive and virulent when dry for months in the cold, under nineteen degrees C.

(4) Sunlight kills the organism within a few hours, provided the sun shines directly upon the organism and the temperature in the sun is over thirty degrees C. The effect of sunlight is not very penetrating.

(5) The virulence of the *bacillus pestis* is often lost before its vegetability.

(6) It is unlikely that new dry merchandise would carry the infection. The organism usually dies in a few days on the surface of objects such as wood, sawdust, bone, paper, etc.

(7) Clothing and bedding can harbor the infection for a long time and may act as fomites. The bacillus lives for months when dry in albuminous media at temperatures under twenty degrees C.

(8) Food products may carry the infection of plague. The bacillus lives a long time in milk, cheese, and butter. It usually dies quickly on the surface of fruits and prepared foods.

(9) The organism may live a long time in water, although plague is not a water-borne disease.

(10) The plague bacillus does not live long on paper, and first-class mail is therefore not apt to convey the infection.

(11) The colder the climate the greater the danger of conveying the infection on fomites—clothing, bedding, food, merchandise, etc.—and more extensive disinfection is required in such a climate in combating the disease than in tropical regions.

(12) The plague bacillus is destroyed by sulphur fumigation and by formaldehyde gas in the strengths in which these disinfectants are usually employed. The gases can only be depended upon as surface disinfectants. In disinfecting ships, warehouses, dwellings, and other places infested with rats, fleas, and vermin, sulphur is better than formaldehyde, because formaldehyde gas fails to kill the higher forms of animal life.

(13) A temperature of seventy degrees C. continued a short time is invariably fatal for the plague bacillus. The ordinary antiseptics are all efficacious in their usual strength for nonspore-bearing organisms. Efficient surface disinfection may be accomplished by exposing objects all day to the direct sunshine on warm days. The temperature in the sun must be above thirty degrees C.

XVI

RABIES; ITS CAUSE, FREQUENCY, AND TREATMENT

BY D. E. SALMON, D. V. M.

Chief of the Bureau of Animal Industry

RABIES IN THE DISTRICT OF COLUMBIA

In December of the year 1892 the brain of a man who had died of a mysterious nervous affection was brought to the laboratory of the Bureau of Animal Industry for examination. It was thought that the symptoms exhibited by the patient resembled somewhat those of hydrophobia, but the physician hesitated to make this diagnosis, as it was not known that rabies existed among the dogs in the District of Columbia, and as the opinion had been widely circulated by certain authors, supposed to have knowledge of the subject, that the disease was so very rare that a single case could not be found by years of energetic search. A careful consideration of the symptoms, however, led to the inoculation of rabbits in order to test the theory of hydrophobia, and somewhat to our surprise, these rabbits in due time became affected with and died of rabies. As the rabies of animals is identical with the hydrophobia of man, and as hydrophobia is practically always contracted from the bite of a rabid animal, the result of this experiment was a demonstration that the man had died of hydrophobia, with a strong presumption that rabies existed among the animals of this section of the country.

Owing to the supposed infrequency of the disease, this case aroused considerable interest; and when, in the following month (January, 1893) information was received that a horse had been destroyed in the city of Washington because it was thought to be affected with rabies, further inoculations were made from the brain of this animal. The rabbits used in this experiment also became affected with rabies.

About this time a disease of cattle was under investigation by the pathological division of the Bureau, and the conclusion was reached that the disease was rabies; but before making a definite decision it was thought advisable to compare it experimentally with the rabies of dogs. Several veterinarians were accordingly requested to bring to the experiment station all dogs suspected of rabies, and the superintendent of the station shot a number of dogs which appeared to be affected. These dogs were all tested by inoculation experiments, and from March 24 to December 12, 1893, eleven were found affected with rabies.

As the investigations which required the virus of rabid dogs were closed in 1893, no further effort was made to procure cases, and no more were recorded until the fall of 1895. Interest was revived in the subject at that time by the death of a woman in Washington from this dreaded disease. Inoculations were made from the dog which bit this woman, but unfortunately the disease developed in the patient at the same time as in the inoculated rabbits, and there was, consequently, no opportunity for prophylactic treatment. This case was reported by Dr. Behrend to the Medical Society of the District of Columbia, and attracted considerable attention.

Arrangements were now made between the District health officer and the chief of the Bureau of Animal Industry whereby all dogs or other animals suspected of having rabies were to be sent to the Bureau laboratory in order that a positive diagnosis might be made. As a result of all these investigations, the number of cases of rabies which have been positively diagnosed and recorded in animals is as follows: 1893, eleven dogs, one horse; 1895, four dogs, two foxes; 1896, five dogs; 1897, two dogs, one cow; 1898, seven dogs; 1899, nineteen dogs, one cow, one cat; 1900, January to August, inclusive, thirty-two dogs, three cows, one horse, one cat. The total number of animals which have been proved to be suffering from rabies in the period from 1893 to August, 1900, is therefore ninety-one. Twenty-eight persons were reported as having been bitten by these rabid animals. The records of the health department of the District of Columbia show seven deaths of human beings from hydrophobia since August 1, 1874.

These developments were entirely unexpected. It was not supposed before the investigations began that rabies existed to this extent anywhere in the United States. Instead of being an extremely rare disease, to be found but once or twice in a lifetime, even by those who are diligently seeking it for the purpose of investigation, as has been represented, the facts cited show that rabies has existed for years almost continuously at the National Capital.

THE DISTRIBUTION OF RABIES IN THE UNITED STATES.

In order to learn something of the occurrence of rabies in other parts of the United States, information was requested of veterinary schools, State veterinarians, and other persons who would probably be in possession of such facts. A number of very carefully prepared replies were received, from which the following summaries have been made:

Dr. Charles P. Lyman, dean of the School of Veterinary Medicine, Harvard University, Boston, Mass.: During an outbreak of rabies, which was recognized as existing in Boston, there suddenly appeared in Harvard Square, Cambridge, one morning, a large crossbred Newfoundland dog. The animal entered a butcher shop and behaved in such a manner as to induce the butcher to throw him a bone and drive him away. The dog seized the bone and went into the street, and after gnawing for a short time he went one after another to five dogs and bit them all. He also bit a horse rather severely in the upper lip. The five dogs came under Dr. Lyman's professional care, and three of them died, showing all the symptoms recognized and described in the books as belonging to rabies. The wound on the horse was seared with a hot iron probably within thirty minutes from the time the injury was inflicted. Notwithstanding this treatment, the horse contracted the disease recognized and described as being rabies.

During a subsequent outbreak a dog bit a policeman on the streets of Lynn. This man declined to take the Pasteur treatment, said he was not afraid, and would take his chances. Within a short time he was taken ill with symptoms recognized by the local medical men as being those of hydrophobia, and he died after dreadful suffering.

Dr. Lyman estimates that there have been twenty-five to thirty cases of rabies observed at the Harvard Veterinary school during the last eighteen years.

Dr. W. J. Coates, chief surgeon of the American Veterinary College, New York: In looking over record books finds on the average about seven cases a year for the past twenty five years. Has never seen a case of rabies in man.

Dr. H. D. Gill, professor of surgery in the New York American Veterinary College, formerly dean of the New York College of Veterinary Surgeons: During the month of May last (1900) three positive cases of rabies came to the hospital, one dog having bitten the three. For the past three years the average was eight cases a year.

Dr. Robert J. Wilson, assistant bacteriologist, department of health, city of New York: Has confirmed the diagnosis of rabies in about forty cases in domestic animals, and three in the human subject. His attention has also been called to two other undoubted cases in that city, where no opportunity was afforded to prove the diagnosis. All of these cases have been observed during the past three years.

Dr. Wilfred Lellmann, professor in the New York American Veterinary College, formerly of the New York College of Veterinary Surgeons: Has been lecturing on canine pathology for the past six years. During the last session has demonstrated to the students four evident cases of rabies. In his private practice met with one case. Of these five cases, four were mute rabies, while the one in private practice was of furious rabies. Besides these five cases, he saw two more at Dr. Gill's clinic. A physician, Dr. Schwyzer, a friend of his, has observed a case of rabies in a man at the German Hospital in New York city.

Dr. Leonard Pearson, dean of the department of veterinary medicine, University of Pennsylvania, and State veterinarian: A great many cases of the rabies have been brought to the hospital connected with this school. Can not tell without looking over a great many records just how many. Estimates that during the fourteen years' existence of the school from 300 to 400 unquestionable cases of rabies have been received in the hospital. Knows of several cases of rabies in man that have occurred in Pennsylvania, and the diagnosis in some of these cases have been confirmed by the inoculation of animals with pieces of the brain. During the last year there have been two fatal cases in Lancaster, one in Kennett Square, one in Philadelphia, and one in Allegheny. Three years ago one of the prominent veterinarians of Pennsylvania died of rabies following the bite of a rabid dog. There has been a great deal of rabies among the farm animals in different parts of the State. Cattle, swine, sheep, and horses have developed rabies of the furious form after having been bitten by a mad dog. A great many of these cases have been examined very carefully, and the diagnosis have been sustained by the results of laboratory examination.

Dr. J. M. Wright, professor in McKillip Veterinary College, Chicago (writing under date of April 5, 1900): Since January 1, 1900, his attention has been called to eleven cases in the dog and three in the horse. During the last year he handled twenty cases, which is a fair yearly average.

Dr. A. H. Baker, professor of theory and practice and dean of Chicago Veterinary College: "Many cases of rabies in dogs and horses have been brought here. We have kept no record of the number of cases, but I can safely say that during the last year we have had at least ten cases in horses and fifty in dogs. I have never seen a case of rabies in man. I may add that we are sincere believers in the Pasteur preventive treatment for rabies in man."

Dr. James Law, director of New York State Veterinary College, Cornell University, Ithaca, N. Y., says:

"This particular locality has never, to my knowledge, since 1868, furnished a single case of casual rabies. It has, however, been repeatedly sent to us from different parts of the state (Chatham, Saratoga, Buffalo, etc.) in the form of brains of the deceased animals, from which small animals were experimentally inoculated and the disease produced, so as to confirm the original diagnosis or suspicion.

"I know of the case of Neil, the keeper of the dog pound at Newark, N. J., who died of rabies consequent on the bite of a rabid dog. I brought a portion of his medulla to Ithaca and inoculated a dog and a number of rabbits, some on the brain and others sub-cutaneously, with the result that all showed rabies after the customary periods of incubation. I have the best of evidence of a number of men who contracted rabies after the bite, and from whom (saliva or brain) inoculation of the disease was successfully made on the lower animals to prove its infective character.

"On the other hand, I know of a number of cases in which people who had been bitten by dogs have developed symptoms of hydrophobia as the simple result of fear, mimicking the symptoms as nearly as their knowledge of the disease would guide them. * * * The unreal nature of such fanciful cases is not, however, any disproof of

the actual infections in which the virulent saliva or brain of the human victim has produced rabies in the lower animals in a continuous series, though they can have no apprehension of such a result. The person who denies the real because there exists a counterfeit is in this case an exceedingly dangerous person, about as much in need of seclusion as the rabid dog itself. The disease prevails at present in Erie County, N. Y."

Dr. S. Stewart, secretary Kansas City Veterinary College: Eleven or twelve cases have been brought to the hospital during the last three years, five within one year. No cases of rabies in man have come under his personal observation. Four or more authentic cases have occurred in that city in past five years. Typical, well-marked cases in dogs, horses, cattle, and swine have come under his personal observation.

Dr. John J. Repp, professor of pathology and therapeutics of veterinary department, Iowa State College of Agriculture and Mechanic Arts, says:

"Since my connection with this school, a little over a year, no case of rabies has been brought to it. By consulting the records I find that no case of rabies has been brought to this school during the twelve years covered by them. * * *

"During the past winter Dr. J. R. Sanders, Corydon, Iowa, has noted the death of eighteen cattle in his vicinity, seven out of one herd of fifty, all showing rabiform symptoms. He killed one of the seven out of the herd of fifty when it was suffering from these symptoms in a violent form, removed the cerebellum and medulla oblongata, according to my direction, and sent them to me packed in ice. I received the tissues in excellent condition, and at once inoculated a rabbit subdurally with a small portion of a mixture made with sterile water and about one-eighth of a cubic centimeter of the medulla cut from the floor of the fourth ventricle. On April 7, two weeks and four days after the inoculation, the rabbit died, after four days' suffering, from gradually increasing paralysis. * * * My diagnosis, therefore, is that the steer from which the tissues were taken was suffering from rabies at the time of his death, a diagnosis borne out by the symptoms presented. If this steer had rabies, it is presumed that the other cattle suffering in like manner had rabies also.

"During my four years' residence at the University of Pennsylvania I saw a large number of cases of rabies in the dog and made a number of rabbit inoculations from such cases with invariably positive results. Rabbits which I inoculated in the same manner from suspected but doubtful cases frequently remained perfectly well, showing that the mere operation will not bring on the symptoms of paralysis and death, and leading to a decision that the suspected cases were not rabies."

Dr. H. J. Detmers, Columbus, Ohio, formerly professor of veterinary medicine in Ohio State University: Has observed four very pronounced and unmistakable cases, three dogs and one horse, since 1893.

The health department of Buffalo, N. Y.: In a recent outbreak, not yet entirely over, investigated, on complaint, forty-five cases in dogs; in addition seventy-four cases of dumb rabies and forty-one cases of furious rabies were brought to the pound. Inoculation were made early from the case of a stray dog that ran amuck at Evans, biting seventeen dogs and two cats. The dogs inoculated developed typical rabies on the twenty-third day following.

Records of the county superintendent of poor and the city department of health show that twenty-nine persons were sent to the Pasteur Institute at New York, four of these being bitten by rabid cats. Four persons died of the disease—the first, a child, eighty-one days after being bitten; the second, the owner of the dog which bit the child, who was sent to the Pasteur Institute at New York, dying there, the disease in him developing on the eighty-third day; third, a young man, bitten by strange dog which he was trying to throw out of a crowded dancing hall, and which was acting strangely, fourth a woman, who died in October 1899, having been bitten by a dog. A considerable number of animals other than dogs also died of the disease.

Dr. A. W. Bitting, veterinarian of the Agricultural Experiment Station of Indiana (writing under date of April 18, 1900), says:

"Your letter was received on the 10th, and upon the 11th we had a typical case of rabies in a dog at this station. This makes the third outbreak at this place. One outbreak occurred last August and September, in which one dog, seven horses, and eight head of cattle died. Part of these were brought to the experiment station laboratories. The first outbreak occurred some years ago, and some two or three dogs in the neighborhood and several sheep and hogs belonging to the station were affected. A number of outbreaks have been reported in the state. I have never seen a case of rabies in man, but our State board of health records three deaths from such a cause last year."

Dr. C. A. Cary, professor of veterinary science in Agricultural and Mechanic College

of Alabama: Six cases have been brought to the college and many others have occurred in the vicinity; altogether twenty-four cases of rabies are recorded at the college.

Dr. J. W. Scheibler, State veterinarian, Memphis, Tenn.: Has seen about twenty cases of what he believed to be rabies.

Dr. George H. Bailey, State veterinarian, Portland, Md.: Has had one case in his private practice, and the Maine general hospital had one case in a young man several years ago.

Dr. A. W. Clement, State veterinarian, Baltimore, Md.: Has had about thirty cases brought to his attention officially.

Dr. Samuel S. Buckley, veterinarian at Maryland Agricultural Experiment Station, College Park, Md., says:

"We had, several years ago, an outbreak in this town, originating, as far as we know, in a collie. This animal, in the course of his depredations, bit three cows, a cat, a calf, and the farm superintendent and his son. All the animals developed the disease before being destroyed. The Farmer and his son were treated by Dr. Gibier, of New York, and never suffered any trouble."

Dr. Cooper Curtice, State veterinarian of North Carolina: Although he has been in that state but about a year, he has noted one case there in the human subject

Dr. W. H. Dalrymple, veterinarian, State University and Agricultural and Mechanical College, Baton Rouge, La.: Has seen one typical case of rabies in the horse and at least half a dozen cases in cattle. From an interview with Dr. J. W. Dupree, surgeon-general of the state and ex-president of the State Medical Association, he learned that the latter has had in his practice three typical cases in the human subject resulting from the bites of dogs. The dogs were not destroyed but kept under observation, and they died, showing typical symptoms of the disease.

Dr. F. A. Bolser, State veterinarian of Indiana: Three outbreaks of rabies in six years, affecting horses, mules, cattle, and hogs. Two young men were bitten, badly lacerated, and died in great agony.

Dr. H. P. Clute, State veterinarian of Wisconsin: Fourteen cases in dogs, sheep, cattle, and horses. A successful inoculation of rabies with virus taken from the brain of a calf and dog has just been made at the experimental station at Madison. The calf died, having been bitten by a sheep that was bitten by a dog. All of these animals died of rabies. Rabbits inoculated with virus from the brain of the dog on March 15th died of rabies on the eighteenth and nineteenth days after inoculation. Those inoculated with virus from the brain of the calf died of rabies on the twenty-first and twenty-second days after inoculation.

Dr. A. T. Neale, director of Delaware Agricultural Experiment Station: Has seen many cases of rabies during the last ten years. Horses, cows and dogs have been the victims. Has no complete record of the number of cases. Specifies the following cases:

(1) A cow, seen before death, was killed two days later, and medulla and sections of cord removed and taken to University of Pennsylvania, where rabies were successfully inoculated. Ten days later these inoculated animals died of dumb rabies. This cow was one of three or four in the same herd which died of similar symptoms.

(2) Inoculation from a suspicious dog at experiment station on rabbit caused death by paralysis ten days later.

(3) A horse observed at 10 A. M. died after four or five hours; was undoubtedly affected with rabies. No inoculation test made.

Two or three dog cases have been demonstrated by Prof. Chester and Dr. Robin at this station since last summer. In every instance rabbits have been the test animals, and in every case the rabid dogs have been under observation for several hours prior to death.

Dr. H. P. Eves, of Wilmington, Del., has many cases of cows and dogs in his practice, victims of this disease. *Dr. J. J. Black, of Newcastle,* has had human cases in his practice.

Dr. M. E. Knowles, State veterinarian of Montana: Has seen about sixty cases of rabies during a practice of fifteen years, of which fifty-three cases were brought to his attention officially.

Dr. J. W. Elliott, State veterinary surgeon of South Dakota: Has had as many as 100 cases brought to his notice officially in the last two years, mostly in cattle, and the origin could be traced to dogs afflicted with rabies.

Dr. G. T. Seabury, State veterinarian of Wyoming: Destroyed a dog affected with rabies in Cheyenne on March 30, and has seen three cases of the disease.

Dr. Sol. Bock, State veterinary surgeon of Colorado: Has seen at least fifty cases of rabies in the past year.

Dr. Paul Fischer, State veterinarian and professor of veterinary science and pathology of Kansas State Agricultural College: Reports a case of rabies in a horse in 1897. The animal was brought to the college and showed very characteristic symptoms. It had been

bitten by a rabid dog three weeks before. The animal died on the following day. Intracranial inoculation of a rabbit with portion of cord of the horse produced death after thirty days from paralytic rabies.

Dr. A. T. Peters, animal pathologist at University of Nebraska: Reports about eight different outbreaks of rabies recorded there. In one outbreak a dog bit several other dogs, and also a cow and a horse. The cow, a fine Jersey heifer, was bitten in the nose. She was quarantined, and thirty-one days afterwards showed all the symptoms of rabies. The horse was bitten very slightly, and showed the disease some two hundred days later.

Dr. L. L. Lewis, professor of zoology and veterinary science at Oklahoma Agricultural and Mechanical College: Two cases of rabies have come under his observation since he has been in that position.

At this writing (December, 1900) information is received from Dr. George W. Coler, health officer of the city of Rochester, N. Y., of an extensive outbreak of rabies in that city and vicinity. Dr. Coler has officially reported to the mayor that since June 1st he has seen from twenty-five to fifty dogs with unmistakable evidences of rabies, a number of the animals having been shown to be rabid by inoculation experiments, which in four cases were verified by Prof. V. A. Moore, of Cornell University, and Dr. M. P. Ravenel, of the University of Pennsylvania. Upon the recommendation of the health officer, the mayor has issued a proclamation ordering "that, until further notice, the owners of dogs are prohibited from allowing them to run at large in any public street or place within the city of Rochester, unless such dogs be securely muzzled or led by a line or chain so as effectively to prevent them from biting any person or animal."

In a valuable article published in the St. Paul Medical Journal, October, 1900, Dr. F. F. Westbrook, director of State Board of Health bacteriological laboratory and professor of pathology and bacteriology in the University of Minnesota, details investigations of specimens from suspected cases of rabies, from which he concludes:

It is very evident that rabies does exist in this state and is fairly widespread in distribution and number of cases. The cases examined, and which proved to be rabies, include one human being, twenty dogs, one horse, seven cattle, one pig, one sheep, and one wolf. We have histories which show that infection was known to be due in these cases to the bites of nineteen different dogs, and perhaps one skunk, in which rabies infection may be assumed from the demonstration of rabies virus in the cases bitten by them. We have also data which show that at the time of the infection of the cases investigated by the laboratory one man, eight dogs, eight cattle, six swine, and six sheep were known to have been bitten, and of these, eight cattle, six swine, six sheep, and three dogs died of rabies—that is, all of the cattle, swine, and sheep developed rabies. The man received Pasteur treatment.

The animals which were thus shown to have had rabies on laboratory investigation are known to have bitten seven human beings, three dogs, six cattle, one horse, and five hogs. Of these, five of the people received Pasteur treatment, and none, so far as is known, developed rabies. Of the animals bitten, five cattle, one horse, one hog, and four dogs developed rabies and died or were killed. Many more of the dogs known to have been bitten were killed before rabies had a chance to develop. As an example, it may be mentioned that in Willmar thirty were killed at one time. These estimates have been carefully made, and where the information at hand stated that several animals had been bitten, account was taken only of one.*

*This statement apparently explains the inconsistency of some of the figures and indicates that in some cases they are below the actual number.

It will, therefore, be seen that from these forty-six cases examined, of which thirty-one were shown to be rabies, and concerning which there was data in only a small portion of the cases, we have been able to obtain positive knowledge of eighty-four cases of rabies in this state. (See table below.)

ITEMS.	Human beings.	Horses.	Cattle.	Sheep.	Swine.	Dogs.	Wolves.	Total.
Rabies diagnosed by laboratory, Minnesota State Board of Health.....	1	1	6	1	1	20	1	31
Animals which bit the animals shown by the laboratory to have been rabid.....	.....	.....	.....	.....	.....	19	.....	19
Animals which developed rabies and died from bites inflicted under the same circumstances as those animals which were shown to have been rabid by laboratory investigation.....	.....	.....	8	6	6	3	.....	23
Animals which developed rabies after having been bitten by animals shown by the laboratory to have been rabid.....	.....	1	5	.....	1	4	.....	13
Total.....	1	2	19	7	8	46	1	84

In the Fifth Biennial Report of the West Virginia State Board of Agriculture for the years 1899 and 1900, Dr. S. E. Hershey, consulting veterinarian, states that quite a number of outbreaks of rabies have occurred within that State in the past few years, with considerable damage and loss of stock. He gives, as coming under his personal observation during the period covered by the report, four cases of cattle and one of a horse, four of which animals were known to have been bitten by dogs. In addition there were many similar cases in the same herds or on the same farms which he did not personally see. In Lewis County several horses died with rabies and several people were bitten. Some of the people were sent to the Pasteur Institute at New York for treatment. Several deaths occurred in the human family in that county.

The Biennial Report of the State Veterinary Sanitary Board and the State Veterinary Surgeon, of Colorado, for the years 1899 and 1900, contains this paragraph:

"Last year an epizootic of rabies occurred in this State, but the outbreaks in all cases have been vigorously handled by the local health authorities, and at the time of making report the epizootic may be considered to be effectually suppressed."

In the vital statistics of the census of 1890, the deaths from hydrophobia in man are reported by States for the year ending May 31, 1890, as follows:

Alabama.....	7	Michigan.....	2
Arkansas.....	4	Minnesota.....	4
California.....	1	Mississippi.....	5
Colorado.....	2	Missouri.....	11
Connecticut.....	2	Nebraska.....	2
Florida.....	2	New Hampshire.....	1
Georgia.....	16	New Jersey.....	3
Illinois.....	3	New Mexico.....	6
Indiana.....	4	New York.....	5
Kansas.....	3	North Carolina.....	3
Kentucky.....	5	Ohio.....	3
Louisiana.....	5	Pennsylvania.....	6
Massachusetts.....	21	South Carolina.....	6

South Dakota.....	1	Virginia.....	2
Tennessee.....	5		
Texas	3	Total.....	143

The results of the census of 1900 not being available, application was made to the health officers of the principal cities of the United States for the number of deaths from hydrophobia in man during the decade from 1890 to 1899, according to their official records. The reports received, to which have been added a few cases reported from unofficial but reliable sources, show that for the period named, and including in some instances the first half of the year 1900, there were in seventy-three cities 230 deaths from this disease after eliminating cases in which the diagnosis was reported as doubtful. The figures for some of the leading cities are as follows:

Greater New York.....	127	Buffalo.....	14
Chicago	68	Pittsburg.....	7
Philadelphia.....	18	Washington.....	5
Baltimore.....	8	Nashville.....	5
New Orleans.....	14		

In a number of these cases the diagnoses were verified by inoculations of small animals with material from the human subjects.

FACTS AND FALLACIES CONCERNING RABIES

It required many years of patient scientific research to lead the ablest investigators to a clear comprehension of the cause, nature, and characteristics of rabies, and it is only recently that this has been accomplished. From the earliest dawn of history the disease has been feared and dreaded; its terrible manifestations have been surrounded with an atmosphere of awe and mystery, and it is not surprising that myths, fallacies and misconceptions in regard to it have been common and widely accepted. Nor have such errors been confined to the ignorant or those unfamiliar with the subject of disease, but on the contrary, they have been shared and propagated by men of learning, some of whom have stood high in the medical world.

As the investigations by which we have come to a tolerably clear understanding of the facts concerning rabies have been comparatively recent, and have appeared for the most part in scientific periodicals, fallacies in regard to the disease still have a strong hold upon the public mind, and are industriously circulated by many who believe they are working in the cause of truth and humanity. Persons in a position to know the facts have either not had the time, the disposition, or the opportunity to take up this subject and show its importance to the people and the desirability of educational work with a view to the control of the contagion. For years we have been living in fancied security from this disease; we have been told

¹ Incomplete as the records of some of the boroughs did not go back for the whole period.

² Only six of these cases are officially reported by the health department, and these are all prior to 1897. In one of the remaining cases inoculation experiments were made with positive results, and the other is well authenticated, though the coroner is reported as refusing to accept certificates of death from hydrophobia, and requiring that the certificates be made to ascribe the deaths to other diseases.

³ All occurred in 1900. No report was received covering the period previous to this outbreak.

that it was extremely rare, if, indeed, it had any existence outside the imagination; and during these years the plague has spread, with only the feeblest efforts for its control, until now it has become so common as to be a positive and constant menace to our animals and to human life. The facts already presented demonstrate its frequency, but they do not give an adequate idea of the losses from it.

In many sections where it exists nature is not recognized. Some outbreaks, in which most of the cases were of the dumb or mute form, were not recognized even by veterinarians. One such case, where fifty or sixty dogs were reported affected, was so characteristic in symptoms that its nature could not be doubted. The "dropping" of the jaw and the uniformly fatal results after a few days' illness attracted attention, but apparently did not excite suspicion. In the Rochester outbreak so many cases of dumb rabies occurred that the disease was popularly known as "drop jaw". Three animals so affected, the health officer states, were found in one load of dogs that was taken to the pound.

In order to convey a clear idea of the subject, some of the principal questions concerning rabies will be briefly considered *seriatim*.

THE REALITY OF RABIES

The first point in regard to which the earnest inquirer seeks information is the reality of rabies. Is there a particular and well-defined disease which can be clearly determined and separated from all other diseases and, which conforms to the description that has become classical in our text-books and has been accepted for generations? In other words, do we know there is such a disease as rabies? and, if so, How do we know it?

GENERAL RECOGNITION OF SUCH A DISEASE AS RABIES

From the time of Aristotle (322 B. C.) till the present day we have clear accounts of this disease existing through every age, and provoking fear and horror in many countries. It was caused by the bite of an animal, and such animal was generally alleged to be rabid. It was almost invariably described as fatal in men and animals. The symptoms, from the earliest times, have been given as nervousness, excitability, restlessness, fear, irritability, great sensitiveness of the skin, paroxysms of fury, spasmodic contractions of certain muscles, paralysis, and death.

The medical profession, as a whole, has always recognized the existence of such a disease as rabies in man, and also that this disease is caused by the bite of a rabid animal. The veterinary profession has, from its foundation, recognized the existence and contagiousness of the disease. Its schools from the earliest to the latest, have consistently taught this doctrine, and its text-books are all but unanimous on the subject. The same may be said of the text-books on human diseases. Would it not be extraordinary, amazing, incredible, if, at this late day, it were proved that the thousands and hundreds of thousands of observations recorded from the birth of history to the present day, by the trained physician or veterinarian as well as by the laymen, were misconceptions, and the authors were deceived, and that the disease was a myth? Where can a parallel be found to such a sudden and complete overthrow of an ancient and almost universally accepted conclusion concerning a phenomenon so accessible to observation and investigation?

INSUFFICIENCY OF OBSERVATION TO PROVE THE DISEASE

There have, however, apparently been a few persons in all ages who have questioned the existence of rabies. The mysterious and unusual phenomena were sufficient to explain this doubt on the part of thinkers and writers without personal experience with the disease, or who approached its study with preconceived opinions. Previous to the nineteenth century it was difficult to answer the objections of such critics. At the most, it could be affirmed that cases of a disease with such a train of symptoms had been observed, and that this disease followed the bite of a dog supposed to be rabid. It could not be proved that the dog which did the biting actually was rabid, or that the disease certainly resulted from the bite, or that the disease in the dog and the man were identical.

EXPERIMENTATION MARKS A NEW ERA IN THE MEDICAL WORLD

With the beginning of the century came a new era in the medical world. The student of disease began to feel the necessity for a more substantial foundation for his knowledge than the ordinary observation of the accidental cases which from time to time occurred in his practice. These accidental cases were often too widely separated for comparative study, the conditions under which they developed could not be known or controlled, and the essential phenomena could not be determined. Observations made and conclusions reached under such circumstances were unreliable. Different observers would reach diametrically different opinions, and one apparently had as good evidence for his views as the other. The confusion and absurd hypotheses which resulted can only be realized by comparing the text-books of a century ago with those of the present day.

The doubts, errors and confusion which arose in the attempt to study disease by the observation of accidental cases were finally dispelled by experimentation. What could be more rational, for example, in case there was a doubt as to the transmission of canine madness by biting, than to make an experiment by allowing a rabid dog to bite four or five other dogs and to keep an equal number unbitten for comparison. If the bitten dogs contracted rabies and the unbitten ones remained free that would be presumptive evidence of transmission. Such an experiment, repeated perhaps a few times, with precautions against accidental infection, would afford positive demonstration as to this essential point in our knowledge of the disease.

DEMONSTRATION OF RABIES BY EXPERIMENTATION

Zinke,¹ in 1804, announced that he had inoculated a dog, a rabbit, and a cock with saliva from a rabid dog, taking the saliva with a brush from the animal soon after its death and spreading it over superficial wounds of the inoculated animals. The dog was inoculated in an anterior limb, and showed prodromic symptoms on the eighth day, and was rabid on the ninth day. The rabbit was rabid on the eleventh and the cock on the fourteenth day.

This experiment, made so early in the century, proved (1) the virulence of the saliva of rabid dogs; (2) that the disease might be artificially inocu-

¹ Zinke, Gottfried: *Neue Ansichten der Hundswuth*, etc., Jena, 1804, S. 180. Quoted by A. Hogen: *Lyssa*, Wien, 1897, p. 32.

lated; (3) that the disease might be communicated by inoculation to the dog, the rabbit, and the fowl; and, (4) it disproved the old doctrine that the contagion disappeared at the instant of the animal's death (*morte la bele, mort la venin.*)

Count Salm-Reiferscheid, in 1813, recorded experiments in which several dogs were inoculated, part with fluid and part with dried saliva from a rabid dog. These were affected with rabies in eight to ten days. This experiment proved that the saliva remained virulent a considerable time after the dog's death, and that it would even withstand a certain amount of drying.

These two series of experiments give us the evidence of the existence of a specific, communicable disease of the dog, which is transmitted by inoculation with the saliva. There was still a question as to whether cattle and sheep, animals which do not naturally defend themselves or combat others by biting, developed virulent saliva when they contracted the disease. To determine this, Berndt, in 1822, inoculated four wethers with saliva from the mouth of an ox which had died of rabies. All of these sheep contracted rabies, the period between inoculation and the appearance of the first symptoms being twenty-two, twenty-five, twenty-six, and thirty-one days.¹

In 1841-42 Professor Ray, of the Veterinary School of Lyons, France, inoculated from sheep to sheep, using the saliva and inserting by lancet punctures. Of seven animals inoculated in this manner, six contracted the disease.²

Renault reported that from 1836 to 1860 he had inoculated or caused to be bitten one hundred thirty-one dogs in his experiments, and that sixty-eight of these afterwards became afflicted with rabies. The period of incubation varied with these animals from ten days to one hundred and eighteen days, and with about eighteen per cent it was sixty days or longer.³ This report gave much information as to the proportion of inoculated dogs which contracted the disease and as to the period which may be expected to elapse between the inoculation and the appearance of the symptoms.

There were many persons, including physicians, who at the beginning of the century doubted the transmission of rabies to man. The medical doctrines at that time were unfavorable to the idea of contagion, and the inclination was to look upon rabies as a simple irritation of the central nervous system. These views were exploded by Magendie, who inoculated a dog under the skin of the frontal region with the saliva of a young man under treatment for rabies. This dog became rabid in about a month, and was allowed to bite two other dogs, which in turn became rabid after forty days.⁴

Earle, Hertwig, Renault, and others made similar inoculations from affected persons to rabbits, conveying the disease. It was also shown that children so young that they could not cause the disease by worry and dread were affected by the bites of rabid dogs in the same manner as adults.⁵

It was, consequently, demonstrated that the rabies is communicable to man as well as to animals, and that the saliva becomes virulent with man as it does with the lower animals.

¹ Journal der practischen Heilkunde. C. W. Hufeland, November, 1824, pp. 59-61.

² Rey: Experiences sur la Rage. Journal de Medecine de Lyon, December, 1842, p. 461.

³ Comptes Rendus Acad. des Sciences, 1863, p. 72.

⁴ F. Magendie; Journal de Physiologie Experimentale, 1821, p. 42.

⁵ Tardieu; Discussion sur la Rage. Bul. de l'Acad. de Med., 1863, p. 1152.

The diagnosis of rabies has been called in question in all ages, and there have always been persons who have asked, How do you know that this particular animal or that this individual person is affected with rabies and not with some other disease of the nervous system? The answer of the investigation is: If inoculations from this animal or this person transmit the disease to the inoculated animals, then it is certain that the individual from which the inoculation was made was affected with the disease, that is to say rabies cannot be produced with the saliva of animals or men affected with noncontagious diseases nor is there any other known contagious disease with similar characteristics which may be confounded with rabies. The inoculation or biological tests is therefore an accurate and reliable test, and should be used in all cases of doubt. It is identical in principle with the biological tests of glanders, pleuropneumonia, foot and mouth disease, rinderpest, variola, and other contagious diseases of animals which have long been used and relied upon in case other methods of diagnosis fail.

The value of rabbits for making the biological tests of rabies was pointed out by Galtier in 1879 and by Pasteur a few years later. The obstacles to this test in practice were (1) that the saliva generally contained various kinds of bacteria and might cause the death of the rabbits from septic infection, and (2) that the period of incubation might be long and uncertain when cutaneous or subcutaneous inoculations were made. The investigations of Pasteur (1881) showed the constant virulence of the brain and medulla, and that these organs, being protected from saprophytic germs, furnished a pure virus which might be used for biological tests. He also showed that the inoculations might be made upon the surface of the brain, in which case the disease was certainly transmitted, and the period of incubation was reduced to a minimum.

Of late years the methods of Pasteur have been widely adopted. There are still skeptics, however, who object to this test, on the ground that it is the irritation to the brain, caused by the inoculation, that produces the disease, and that there is no proof of contagion when the rabbits die of supposed rabies. These people forget, however, that it is always possible in case of doubt to make the inoculation in the skin or muscles, or even to use larger animals, such as horses, cattle, sheep, or dogs. Rabbits are only used because they are cheap and convenient. Brain inoculations are made because they are more certain in results and the disease appears sooner. The Pasteur method has been sufficiently confirmed by other methods, and its reliability clearly demonstrated.

Successful experiments of this order, numerous, and made by competent men, are absolutely conclusive as to the existence of a disease of the dog communicable to human beings, to dogs, and other animals by biting and by inoculation with the saliva. If this disease is not rabies, what is it? And if it is given some other name, do not the facts stand the same under one name as under another?

It is a mistake to say that the disease alleged to be rabies has not been defined with sufficient clearness for its identification. Consider for a moment the description: A disease affecting principally the nervous system, shown by nervousness, excitability, restlessness, irritability, paroxysms of fury, uncontrollable desire to bite all other animals, convulsions, paralysis, death;

caused by the bite of an animal similarly affected; communicable by inoculation with the saliva; having a long period of incubation (three to six weeks); comparatively short course of disease (two to ten days); invariably fatal. Is not that picture clear enough for identification? With what other disease can it possibly be confused?

The reality of rabies has been demonstrated by crucial experiments, so often repeated that there is no longer any reason for doubt. It is a fact established with the same certainty as any other fact in science, and it can not be overthrown by hypothetical arguments or general denials based upon intuitive reasoning.

THE COMMUNICABILITY OF RABIES TO MAN

Aristotle taught that rabies was fatal to dogs and to every other creature which they bite except mankind. This early mistake as to the immunity of man has been carefully handed down across the succeeding twenty-two centuries as though it were the most precious bit of knowledge, and is still repeated on every hand by the many who oppose measures for the prevention of the disease. There was some apparent support for this opinion in a number of facts connected with the disease. First, only a portion of the persons bitten by rabid dogs subsequently show symptoms of the disease; taking all the statistics available, not more than one individual in every six thus bitten is found to contract rabies even when no prophylactic treatment is administered. Second, there are other abnormal conditions of the nervous system in man which are accompanied by symptoms resembling more or less closely those ascribed to rabies. Third, some persons who have been bitten by dogs not rabid have by constant worry, anxiety, and fear of rabies induced a nervous, hysterical condition, with symptoms simulating somewhat those of the actual disease.

With these known facts as a basis, it is not surprising that a certain number of writers of limited experience and the habit of superficial observation should reach the conclusion that the view of Aristotle was correct, and that the disease was not transmissible to man. They argued that it was only the comparatively few nervous and excitable people among those bitten who afterwards presented symptoms of rabies, and that these few had brought on these symptoms themselves by worry and fear, being affected not with true rabies, but with lyssaphobia (fear of rabies), which is simply a nervous and hysterical condition.

This reasoning was quite plausible a century ago, but it received a definitive answer when Magendie and other investigators inoculated dogs and various other animals from human victims of the disease, reproducing it in typical form. These experiments proved most conclusively that man as well as the lower animals is subject to rabies, and that when so affected his saliva becomes virulent, and may be the means of communicating the malady.

At present, when it is desired to make a positive diagnosis in a case of suspected rabies, this is done by the inoculation of some animal, usually a rabbit. Objection has been made by some critics to results obtained by inoculation of small animals, on the ground that the symptoms of the disease with such animals are not sufficiently characteristic to warrant a positive conclusion. This objection has little weight, since the long period of

incubation (fourteen to twenty-eight days), the sudden appearance of the symptoms, the paralysis, and the short course of the disease, ending in death, are not likely to be seen in any other disease. In case of doubt, it is always possible to inoculate a larger animal, such as a dog, calf, or sheep, and thus reach an incontestable decision. The results of rabbit inoculations have been confirmed so many times by the inoculation of other animals that there is no longer any reason to doubt the occurrence of rabies in mankind or the reliability of the diagnosis by the usual tests.

Numerous cases of rabies in the United States affecting the human subject have been reported from various parts of the country, and tests have been made by our most competent investigators. These tests show how the disease not only exists, but that it is far more common than has been generally admitted. The extensive outbreaks of the disease in dogs reported from Buffalo, Rochester, and Washington City during the past year, and the numerous smaller outbreaks which have occurred in widely separated localities, are disquieting, and show the importance of more systematic repressive measures. A considerable number of persons, mostly children, have been bitten in these outbreaks, some of whom have died after the most intense suffering. Others have taken the Pasteur treatment, at great expense and inconvenience.

These are the facts in regard to the occurrence of rabies in man and animals in the United States. When the medical statistics of other countries are consulted there is found in many of them the same conditions. In Austria, Belgium, France, Germany, and Russia, the official reports show a large number of cases of rabies in dogs and other animals each year and a certain number in man. These are among the most enlightened countries of the world, where medical science has achieved its highest advancement, and where the theory of error on the part of the health authorities in regard to the nature of the disease is out of the question.

Such facts are met by the assertion that one prominent physician in Philadelphia has been endeavoring to find a case of rabies in man or in one of the lower animals for sixteen years without success; that another physician in New York has not been able to satisfy himself of the reality of the disease after many years of investigation, and that a neurologist in Washington City has publicly offered a reward of \$100 for a case of rabies in man or dog. These assertions are plausible, and to those unacquainted with all the facts they may be convincing. In reality they are deceptive and misleading. There have been numerous cases of rabies in dogs brought to the veterinary department of the University of Pennsylvania every year for many years, and any physician in Philadelphia could make arrangement with that institution to see and study the cases if he so desired. In the same manner any reputable physician in New York could have arranged with one of the veterinary schools or with the board of health in that city for a similar opportunity. There have been also rather frequent reports in the medical journals of patients at the hospitals in that city affected with this disease, and in some cases inoculation tests have demonstrated the correctness of the diagnosis. How can it be possible that a prominent physician living there and presumably well acquainted with the members of his profession has diligently searched for years for such cases and failed to find any? As to the neurologist in Washington City, the writer publicly answered his adver-

tisement, and proposed to produce a case of rabies, the genuineness of the disease to be decided by a committee by the Medical Society of the District of Columbia, and the reward, if earned, to go to a charitable purpose. The gentleman, however, did not accept the proposition, but withdrew his advertisement, and apparently had no further desire to see a case of the disease.

THE FREQUENCY OF RABIES

Some idea of the frequency of rabies in the United States may be obtained from the facts which already have been given. The cases mentioned are, however, only a few of what have occurred in the country, since the inquiry which elicited them has been by no means extensive or exhaustive. It was nevertheless sufficient for the purpose, which was to show the wide distribution and comparatively frequent cases of the disease. It may be safely concluded that instead of being a much more rare disease than is generally supposed, it is a much more common disease than we had reason to expect.

In many other countries the disease is equally prevalent. The official reports of Germany show 1,202 cases of rabies in animals (mostly dogs) in 1898. In France there were 2,374 animals affected in 1899. In Belgium there were 444 cases. In Great Britain there were 727 cases in 1895, and in Hungary 1,397 cases in the same year.

It is frequently asserted as an argument against the existence of rabies, that it is unknown at Constantinople and in India, where dogs are common and unrestrained. But why go to distant countries, from which it is difficult or impossible to get accurate information, for arguments on this subject, when the disease exists in our own cities, where it is accessible and may be investigated. If the condition of New York City, with its newspapers, board of health inspectors, veterinary schools, and highly intelligent population, is misrepresented, what may not be said of Turkey and India without fear of successful contradiction!

Whether rabies is or is not frequent in the Orient has little bearing on its existence here. What we know is that the disease is or has been common in all of the highly advanced and best known countries of the world. Our investigations show that it is equally common in the United States. These facts can not be overturned by the citation of reports from other countries, even if the accuracy of such reports were satisfactorily established. The frequency of rabies in the United States can only be determined by careful scientific investigations here, and not by reports from elsewhere. The cases cited from European countries have been produced simply to show that the disease was common there as well as here, that it is recognized by scientific authorities and by the leading governments, and that, consequently the statement sometimes made to the effect that the highest authorities in the world deny the existence of rabies is incorrect and without foundation in fact.

THE EFFECT OF SEASONS UPON THE DEVELOPMENT OF RABIES

Homer is supposed to refer to rabies when he mentions the dog star, or Orion's dog, as exerting a malignant influence upon the health of mankind. This ancient belief has come down to our times, many intelligent people still holding that it is principally during the dog days that rabies develop, and that the disease can not exist during the cold months of the year. The

scientific study of the disease and the statistical records show, however, that rabies is prevalent in winter as well as in summer, and that if the season has any influence upon its development this influence is not very marked.

Bouley¹ compiled statistics showing 755 cases in December, January, and February; 857 in March, April, and May; 788 in June, July, and August; and 696 in September, October, and November. At the Alfort Veterinary School for the years 1887, 1888, 1889, and 1890 the cases were as follows: January, February, and March, 130; April, May, and June, 60; July, August, and September, 50; October, November, and December, 74.

The following table, giving a large number of cases by months, has been compiled from statistics at hand:

Cases of Rabies in Dogs, by months.

Source.	Jan.	Feb.	Mar	April	May	June	July.	Aug.	Sept.	Oct.	Nov.	Dec	Total
Bourrel ¹ ...	36	31	26	32	32	42	32	30	35	41	24	32	393
Saint Cyr ² ...	12	15	6	15	13	7	4	9	1	3	.....	2	87
Hogyes ³ ...	39	310	314	367	450	502	580	537	455	438	303	396	4,961
Leblanc ⁴ ...	103	97	121	192	155	138	147	123	104	117	95	100	1,492
France ⁵													
1895...	89	155	153	184	181	129	157	147	133	110	105	149	1,692
1896.....	124	138	151	150	147	199	138	117	131	125	103	164	1,687
1897.....	131	151	189	202	225	172	192	154	136	131	150	140	1,973
1898.....	139	148	.....	181	216	278	185	177	150	.....	153	154	1,781
Total.	913	1,045	960	1,323	1,419	1,467	1,435	1,204	1,115	965	933	1,127	14,066

¹ Fleming: Rabies and Hydrophobia, London, 1872, p. 96.

² Loc. cit. p. 97.

³ Hogyes: *Lyssa*, Wien, 1897, p. 25.

⁴ Leblanc: *Statistique de la rage*, Bul. de l'acad. de med., 1880, pp. 960-963.

⁵ Official statistics.

These statistics are very interesting, and effectually dispose of the fallacy that rabies can not occur in the winter. The compilation of Bouley shows 755 rabid dogs in December, January, and February, and 788 in June, July, and August—a very slight difference, and one which is probably without significance. The records of the Alfort Veterinary School are of especial value, because the diagnosis was made by the most skillful experts in the world. These show two and one-half times as many cases in January, February, and March as in July, August, and September. Taking the compilation of 14,066 cases by months, it is found that June stands highest, with 1,467 cases, or about 25 per cent more than the average. July is second, with 22.4 per cent over the average. May is third, with 21 per cent over the average. It would appear, therefore, that the most cases of rabies occur during May, June, and July, which are not usually the hottest months of the year. If the heat has any considerable effect in the development of rabies we should expect August to show the largest number of cases; but, as will be seen by the table, it stands fifth in the list of months, with only 10.4 per cent more than the average, being below April, which has 12.8 above the average.

The fewest cases occurred in November, which had 20.4 per cent less than the average; January had 19.5 per cent less than the average; March was 18 per cent below the average. As if to emphasize the uncertainty or predicting the distribution of rabies by seasons, according to the average

¹ Dict. de Med. de chir. et d'hyg. vet. Zundel, Paris, 1877, p. 348.

temperature, February stands but 10.8 per cent below the average number of cases and December but 3 per cent below.

In a general way it may be provisionally admitted that more rabies occurs in dogs in the months from April to September inclusive, than from October to March; but the disease is seen in every month of the year, and as June stands highest, with 1,467 cases, and November lowest, with 933 cases, the difference is not sufficient to warrant any one in deciding that a suspected animal is not affected with rabies because the symptoms are observed in one of the winter months.

THE SYMPTOMS OF RABIES

The symptoms of rabies are such as we should expect from serious disease of the central organs of the nervous system: First, irritation; second, paralysis and death. The rabies virus appears to have little effect upon the system until it reaches the brain and spinal cord. There it multiplies, sets up irritation, and finally interrupts the functions.

Rabies is generally divided into two forms; First, furious rabies; second, dumb rabies. In the former the animal is irritable, aggressive, and bites nearly every object which comes in its way; in the latter the muscles of its jaw are paralyzed almost from the first appearance of symptoms, and being unable to bite, the animal remains more quiet and tranquil. Essentially the two forms of the disease are the same, but owing to the parts of the brain attacked and the acuteness of the attack, paralysis appears much sooner in one of these forms than in the other. The saliva from a case of dumb rabies is just as dangerous and virulent as that from a case of furious rabies. The dogs with dumb rabies are less dangerous simply because they are unable to bite and thus insert their saliva into a wound.

The impression should not be formed that dumb rabies and furious rabies always represent two distinct types of disease, and that one may at a glance classify every case as belonging to one or the other of these types. Quite the contrary. The typical cases belong to the two extremes of symptoms, and there are all gradations between the two. In fact, almost every case of furious rabies sooner or later changes into the dumb form, that is, the final stage of rabies is almost invariably paralytic, and the dumb form in its typical development occurs when the paralysis appears on the first day of the disease. The paralysis may not appear, however, until the second, or third, or some subsequent day.

Again a dog does not necessarily bite everything about it even though it has rabies and its jaws are not paralyzed. It may be combative and furious all of the time, or only part of the time, or not at all. There is no disease in which the symptoms vary more than in rabies of the dog, and it is, consequently, impossible in any description of moderate length to give an idea of the different forms under which it may appear.

FURIOUS RABIES

Fleming has well said that it is a great and dangerous error to suppose that the disease commences with signs of raging madness, and that the earliest phase of the malady is ushered in with fury and destruction. The symptoms appear very gradually, and at first there is only the slightest evidence of brain disease. The animal's habits and behavior are changed. It

may be more restless and affectionate than usual, seeking to be near its master or mistress, fawning, licking the hands or face, and apparently seeking for sympathy or assistance. Such caresses are, however, extremely dangerous, for the animal's tongue, moist with virulent saliva, coming in contact with a part where the skin is thin, abraded, or wounded, may fatally infect the person for whom it is endeavoring to demonstrate its affection. The smallest abrasion may be, as Bouley has impressively said, a door opened to death; and such a death! The instances in which hydrophobia has developed from such inoculations are very numerous, and everyone should be warned against the kiss of affection, which carries with it not only death, but sufferings which are far more to be dreaded than the fatal termination.

In most cases dogs first become dull, gloomy, morose, taciturn, seeking solitude and isolation in out-of-the-way places, or retiring under pieces of furniture. But in this retirement they can not rest; they are uneasy and agitated; they lie down and assume the attitude of repose, but in a few minutes are up again walking hither and thither, "seeking rest, but finding none." Occasionally this restlessness may disappear for a time, and the animal become lively and affectionate; oftener it sinks into a sullen gloominess, from which even its master's voice rouses it but temporarily. It becomes more and more desperate in its efforts to prepare a comfortable bed, pawing or scattering the straw, or, if in a house, scratching, tumbling, and tearing cushions, rugs, carpets, and everything of that kind within its reach.

At this period dogs may have aberrations of the senses, of the sight, hearing, and feeling, which cause hallucinations, and lead them to think that they are being annoyed by something, or that some animal or person is endeavoring to injure them. They crouch, ready to spring upon an enemy; they rush forward and snap at the air; they throw themselves, howling and furious, against a wall, as though they heard sounds beyond it.

While at first the affected dog may not be disposed to bite, it becomes more dangerous as his hallucinations and delirium increase. The voice of the master or of an acquaintance may dispel the aberrations temporarily and lead him to friendly demonstrations, but an unexpected movement or touch may bring on another access and lead to a quick and unexpected bite.

The disturbance of the sensations leads to chills and itching. If the place where the bite occurred is accessible the dog licks the scar, and later bites and tears the tissues. This tearing of the flesh is not always confined to the site of the inoculation, but certain regions of the body appear to lose their sensitiveness, and at the same time to convey to the brain the sensation of itching. The animal in this case bites into its own flesh with apparent pleasure and satisfaction.

Such animals take food until the disease is considerably advanced, if it is something which can be swallowed without mastication; otherwise it is dropped after remaining a short time in the mouth.

Difficulty of swallowing is an early symptom, and frequently leads the unsuspecting owner to conclude that the animal has *a bone in his throat*. A dog which appears to have a bone in his throat is on general principles one of the most dangerous animals in existence. The supposed bone may be there, but on the other hand the symptoms which lead to this supposition

may be due to partial paralysis caused by rabies, and the owner may be inoculated with the virulent saliva while thrusting his finger or hand in the dog's mouth to discover a bone which has no existence but in his imagination.

It is commonly believed that mad dogs have fear of water and are unable to drink, but there could be no greater mistake. In this respect they differ entirely from the human patient. They have no fear or dread of water, but continue to drink until paralysis has progressed so far that they are no longer able to swallow. The fact that a suspected dog is seen to drink or to wade into a stream is consequently no evidence that he is not mad.

When the furious symptoms come on, the dog leaves his home and goes upon a long chase, with no apparent object in view other than to be traveling onward. He trots at a rapid pace, eye haggard, tail depressed, indifferent to his surroundings. He flies at and bites dogs and persons whom he meets, but usually does not apparently search for them, or even notice them if they remain quiet. Dogs in this condition may travel many miles, and finally drop from exhaustion and die. Often after an absence of a day or two they return to their home, exhausted, emaciated, covered with dust and blood, and presenting a most forlorn and miserable appearance. Those who have pity for such an animal, and try to make it clean and comfortable, are in great danger of being bitten, for the disease has advanced to a point where the delirium or insanity is most marked, and where a treacherous bite is most common. Doubtless the dog has no intention of injuring a friend, and would not do so did he not see that friend transformed by his disordered vision into some distorted and unrecognizable shape, which he thinks is about to injure him. But while we may give the dog due credit for not intentionally and deliberately inoculating his friends with this fatal virus, let us not forget that the inoculation is no less deadly because it is the result of the abnormal working of a disordered mind. Whatever the sentiment may be which leads the dog to turn upon his master or mistress and inflict an injury, the duty remains the same for the owner to take due precautions to prevent such an occurrence.

If the animal, instead of being allowed to escape, is kept confined, the paroxysms of fury are seen to occur intermittently, or in the absence of provocation, they may be entirely wanting. If excited, it howls, rushes upon objects that are thrust toward it, or throws itself against the bars of its cage and bites with great fury.

As death approaches, the animal becomes exhausted and scarcely able to stand; the eyes are dull and sunken, and the expression is that of pain and despair. Paralysis appears in the jaws or in the posterior extremities, and extends rapidly to other parts of the body. The animal, being unable to stand lies extended upon its side; the respiration becomes more and more difficult; there are spasmodic contractions of certain groups of muscles, complete prostration, and death.

The ordinary course of the disease is four or five days; it may be as short as two or as long as ten days.

DUMB RABIES.

When this form of the disease is typical, it comes on with restlessness, depression, a tendency to lick objects, and paralysis of the muscles, which close the jaws. As a consequence of the paralysis, the lower jaw drops, the

animal is unable to close the mouth, the tongue hangs out, and an abundance of saliva escapes. The mucous membrane of the mouth becomes dry, discolored, and covered with dust. The animal remains quiet, does not respond to provocations, and appears to understand its helplessness. As Bouley has said, the animal can not bite and does not desire to bite.

When dumb rabies follows a period in which the animal has been affected with the furious form, the desire and tendency to bite may be retained even after the jaw is paralyzed.

The course of the disease is short, death usually occurring in from two to four days.

The dumb form of rabies is very common, and many persons know it as "drop jaw" who have no idea of its true nature.

Many of the common mistakes with reference to rabies arise from an imperfect knowledge of the symptoms. It is on this point that there is greatest need of educational work. Bouley has most earnestly warned us to "distrust a dog when it shows signs of illness; every sick dog should as a rule be suspected; more particularly distrust a dog when it becomes dull, morose, and seeks for solitude, which appears not to know where to rest, which is always on the move, prowling, snapping at the air, and suddenly barking at nothing when all around is perfectly still, whose countenance is somber, and only assumes its usual animated expression by brief starts; beware of the dog that seeks and scrapes incessantly, and exhibits aggressive movements against phantoms; and finally; beware, above all, of the dog which has become too fond of you, and is continually endeavoring to lick the hands or face."¹ The writer would add to this warning the injunction to beware of the dog which appears to have a bone in his throat, and further beware of this animal when he has wandered from home and returns covered with dirt, exhausted and miserable.²

THE PERIOD OF INCUBATION OF RABIES

The period of incubation of a contagious disease is the time which elapses between the inoculation or exposure and the appearance of the first symptoms. With rabies this period varies remarkably. It may be as short as six or seven day, and it occasionally exceeds one hundred days. In rare cases, it has been reported on good authority that a year, or even fourteen months, elapsed between the time the animal was bitten and the time when the disease manifested itself. The majority of cases develop in from three to seven weeks.

During the greater part of the period of incubation the infected animal is healthy, and would not cause disease in any animal or person which it bites. The saliva may become virulent, however, two or three days before the appearance of the first symptoms, and any animal or person bitten after the contagion has contaminated the saliva is, of course, liable to contract the disease.

There is a very erroneous and rather stupid belief, quite common, to the effect that if a dog bites a person and becomes mad at any time thereafter the person so bitten will contract hydrophobia. This fallacy may have arisen from some instance in which a person had been bitten within a few

¹ Fleming: Rabies and Hydrophobia, London, 1872, p. 197.

² In this description of rabies the writer has used as a basis the classical works of Bouley, Fleming, and Nocard and Leclache.

days of the appearance of the symptoms of disease in the dog, and when the saliva was already virulent. However this may be, it is perfectly certain that a dog cannot convey this disease when he does not have it or before he has himself contracted it. If, therefore, a dog does not show symptoms of rabies within a week from the time the bite is inflicted there is no danger of the person contracting the disease. The only possibility of an exception to this rule is the very doubtful one, that in extremely rare instances a dog may have rabies and recover from it without showing characteristic symptoms. A very few cases of this kind may have been observed among dogs artificially inoculated, but it has not been shown that their saliva became virulent or that similar cases occur under natural conditions. The fact remains, however, that a person is in no danger of contracting rabies because a healthy dog has bitten him, which dog is afterwards inoculated with rabies.

The virus of this disease has been surrounded with so much mystery, and so many ridiculous opinions have been disseminated concerning it; that it is often looked upon with great awe and fear, as possessing either supernatural properties or at least being altogether different from anything else which has been known and investigated by scientific men. This is in no sense true, for while the rabies virus is peculiar to the disease and distinct from all other contagions and poisons, it is nevertheless subject to the same natural laws. If a person has set in a crowded street car by the side of another person who some months afterwards contracts smallpox, the former would have no fear of the disease because he had been exposed to the latter before infection had occurred. On the same principle, no one would feel concerned because he had drank pure water from a clean cup, which cup was afterwards used as a receptacle for poisons. These illustrations are strictly germane to the subject, and should be sufficient to show the impossibility of the theory under consideration.

The extremely long period of incubation of rabies in certain cases is a fact which has been incontestably established.

Peuch has compiled a table of 144 cases of rabies in the dog in which the date of inoculation and the appearance of the first symptoms were definitely ascertained. These cases were observed by Renault, Leblanc, Saint-Cyr, and Peuch. This table is so instructive that it is reproduced from the *Nouveau Dictionnaire de Médecine, de Chirurgie et d'Hygiène Vétérinaire*, and the writer has added a column of percentages.

INCUBATION OF RABIES IN THE DOG.

Number of days of incubation	Number of cases.	Per cent.	Number of days of incubation.	Number of cases.	Per cent.
5 to 10.....	3	2.05	55 to 60.....	2	1.39
10 to 15.....	8	5.55	60 to 65.....	7	4.86
15 to 20.....	13	9.03	65 to 70.....	1	.65
20 to 25.....	25	17.36	70 to 75.....	5	3.47
25 to 30.....	13	9.03	75 to 80.....	7	4.86
30 to 35.....	25	17.36	80 to 90.....	4	2.74
35 to 40.....	6	4.17	90 to 120.....	1	.65
40 to 45.....	11	7.64	365.....	1	.65
45 to 50.....	9	6.25			
50 to 55.....	4	2.78	Total.....	144	

Haubner mentions a case in which fourteen months elapsed after the bite before the disease developed. It is plain, therefore, that the rabies virus may retain its vitality and activity for a long time after it is deposited in the flesh of the animal body. How it can remain in the animal this length of time before it causes the disease is probably explained by the fact that it must reach the brain and spinal cord and multiply there before the disease develops. Now, the rabies virus is not able to penetrate through the body with the facility of many other forms of contagion; on the contrary, it appears necessary for it to be lodged in the circulating blood through a wounded vessel or to be deposited within the sheath of a nerve. If placed in the connective tissue beneath the skin in such manner as to avoid blood vessels and nerves it does not cause disease. In the cases of long incubation the virus has had difficulty in reaching the central organs of the nervous system.

Admitting, as we must, that a year may elapse between inoculation and the appearance of the disease, we must also accept the still rarer cases of fourteen months' incubation as not improbable. How absurd it is, therefore, to consider a bitten dog as safe after it has been quarantined for three or four weeks, as is the usual custom. Of the 144 cases carefully observed and brought together in the above table, 82, or 57 per cent, failed to develop the disease until after thirty days. A period of more than five weeks was required by 39.5 per cent of the animals, and 21.5 per cent showed no symptoms for seven weeks after being bitten. How long, then, should a dog that has been bitten by a rabid animal be quarantined before it is safe to mingle with the family and with other persons and animals? Is three months sufficient? Evidently not, for 3.47 per cent of this lot of dogs developed the disease after more than ninety days had passed. For absolute safety, every dog bitten by a rabid animal should be destroyed. For comparative safety a quarantine of one year is required.

DOES RABIES ORIGINATE SPONTANEOUSLY?

Most of the older writers on rabies, those whose writings appeared before 1865, admitted that the disease might develop spontaneously in the bodies of certain animals as a result of certain conditions of life and atmospheric influences. These same writers believed that most other contagious diseases frequently originated in the same manner. It was a time when the spontaneous generation of many living things was freely admitted, and when the ignorance of the nature of all kinds of contagion, with the exception of the larger animal parasites, was complete and impenetrable. Science had not yet definitely passed upon the doctrine of the spontaneous and continuous generation of living matter.

It was not a very long time before this when it was believed that the mite which causes scabies or itch was continuously developed spontaneously, and that it was folly for people to try to protect themselves from this disease. About the same time, or possibly a little earlier, it was thought that lice were spontaneously developed, and that both the domesticated animals and mankind were doomed to suffer from them for all time. Still earlier there was a common belief that crocodiles and other animal life developed spontaneously from the mud of the rivers and lakes in which they were found.

The study of natural history and the progress of science disproved one by one of these ancient beliefs, and made it clear that all animals developed

from preexisting animals of the same kind. Even lice and the mites of scabies were found to be subject to this invariable law of nature, and the eradication of such pests was taken up with energy and perseverance. The rarity with which these parasitic pests are encountered among civilized people of the present day proves the value of correct views upon such questions.

The last point to be yielded by the believers in spontaneous generation was the origin of the protozoa and bacteria, microscopic animals and plants so small that their life history could be studied only with great difficulty. It was finally shown, however, that even these infinitely small organisms obeyed the general law of nature and propagated and developed from ancestors, each species after its kind, and that in the absence of ancestors not even these low forms of life could appear.

About this time it began to be suspected that the cause of the contagious fevers was microscopic organisms, which were able to live a parasitic life in the bodies of men and the larger animals. After many observations pointing in that direction it was finally demonstrated in 1876 that the cause of anthrax was a bacillus, and shortly afterwards the fowl cholera, septicæmia, hog cholera, tetanus, blackleg, tuberculosis, and various other diseases were due to similar microscopic vegetable organisms, each disease being caused by its own distinct species of germs. It was also shown that malaria, Texas fever, and some other diseases were caused by microscopic animal organisms belonging to the protozoa, and that here again each disease had its own definite and distinct species. In every case the minute plant or animal parasite had its own definite form and certain biological characters by which it might be distinguished from all other living things. Each species multiplies and propagates its kind, and there is no more evidence here than elsewhere in nature to sustain the doctrine of the spontaneous appearance of living things.

The first effect of these scientific demonstrations was to clear away a vast amount of rubbish which had accumulated in the standard teachings as to the cause of contagious diseases. If, for example, anthrax is caused by the *Bacillus anthracis* gaining entrance to the interior of the body and multiplying there, and if the disease can not be produced in the absence of this bacillus, then it becomes plain that the disease is not caused by electrical disturbances of the atmosphere, by too much food or too little food, by forage containing too much water or that which is too dry, by intense heat of summers or extreme cold of winters, or indeed by any of the other influences to which the development of the disease had been usually attributed. It was contact with substances containing the bacillus which produced the disease, and when this bacillus gained access to the animal body the disease developed without reference to the atmospheric conditions, the food, or the other elements of the environment.

The comprehension of this fact led Bouley and other great pathologists to revise their opinion regarding the origin of many contagious diseases. It had been held that glanders originated spontaneously from overwork and insufficient food; that bovine pleuropneumonia developed as a result of exposure of cattle in the mountains of Europe to extremely low temperatures; that cattle plague arose spontaneously in eastern Europe and particularly on the steppes of Russia, and that rabies in the dog resulted from

unfavorable conditions of life. The demonstration of the germ theory of contagion, which was quite unexpected by the majority of medical men, completely overturned these old views, based upon an entirely different hypothesis. The idea of spontaneous development, of origin *de novo*, was generally abandoned, and the further scientific researches have been pushed, the more incontestable does it appear that the one and only factor of consequence in the production of these diseases is the entrance of the disease germ into the interior of the animal body, where it can multiply and disseminate itself.

If proper measures are taken to protect animals from the bacilli of anthrax, of glanders, of pleuropneumonia, they do not contract these diseases. Investigation of cattle plague in central Europe indicated that the disease always came from the East. Investigations on the steppes of Russia showed that it did not originate there, but came from the plains of Asia. Investigations in Asia indicate that even there the disease is always the result of contagion from some other affected animal. In the same manner, investigations of rabies failed to bring out any evidence to indicate that the disease might originate in any way except by contagion, that is, by inoculation from an affected animal. It may, therefore, be accepted as practically certain that rabies does not develop spontaneously in any animal, but that it is always the result of inoculation from some other affected animal.

If the doctrine of spontaneous generation, or abiogenesis, has been abandoned by scientific men, it has by no means lost caste with many persons who consider themselves philosophers; and these persons hesitate to accept or indeed bitterly contest the conclusion of science, which has been outlined above. If, they ask, every dog with rabies contracted the disease from some other dog affected with it, how did the first dog get it? This is a question as to the origin of things, which we may with equal reason ask in regard to all living organisms. If every dog is brought into the world by the sexual union of two other dogs, where did the first dog come from? This question is just as difficult, but no more difficult than the other. Because we have in our question implied the philosophical absurdity of a series of dogs without a beginning, we have not convinced anyone that dogs can originate in any manner except by ancestors of their own species; nor is the similar question as to the origin of the first case of rabies any better reason for accepting the theory of the spontaneous origin at the present day of this disease.

There are many diseases of which it may be said that in our time and in our country they arise only by contagion. Prominent among these are small-pox, scarlet fever, measles, cholera, tuberculosis, glanders, bovine pleuropneumonia, foot-and-mouth disease, and rabies. Recorded history does not tell us where and under what circumstances the first case of any of these diseases appeared, any more than it tells us where and under what circumstances the first dog appeared. We know by observation, and by observation alone, how dogs are propagated at the present day, and we accept observation as conclusive upon this point. Why should we not accept observation and experimentation as conclusive in regard to the propagation of a contagious disease?

While we can not reasonably expect at this late day to decide the cause of contagious diseases by the speculation as to the first appearance among animals

of such diseases, it is legitimate to make such an inquiry in order to obtain a better understanding of these plagues. Science has made great progress in explaining the origin of species, and even in tracing in general terms the development of life upon earth; and while it can not say definitely where, when, and how the dog originated, it has been made plain that in some prehistoric age the dog developed from some earlier and related form, not by a sudden transformation, but by gradual transition. And in the same manner this early ancestor of the dog developed from a still earlier ancestor, doubtless quite different from the dog as he is to-day. To be brief, in tracing the development of the dog, we should be obliged to go back, step by step, toward the dawn of creation, toward simpler and simpler forms of life, until the primordial germ is reached. Just where in this long series of succeeding forms or just when in the countless ages that have elapsed since the beginning of the series the disease known as rabies appeared it is impossible to say. It may have been in comparatively recent times, and when the dog had arrived at substantially its present form and development, or it may have been in some previous geologic age, when the conditions of environment upon all parts of the earth were far different from what they are at the present day.

It is not to be supposed that the strange animals whose fossil remains prove their existence many thousands of years ago were free from contagious diseases any more than are the animals which live today; but whether the diseases of the prehistoric animal species were propagated from animal to animal until our time, or whether they disappeared and were replaced by more recent plagues, it is now impossible to say.

A study of the communicable diseases indicates that most if not all of them are caused by parasitic organisms. Indeed, the animal body has become the host of a multitude of parasites, most astonishing because of the number of species and the great variety of forms. All of the parasites probably at one time in the existence of their species, or of the ancestors of their species, lived elsewhere in nature. Under certain conditions they were attracted to certain kinds of animals; they found they could live upon or within them; they adopted themselves to these new conditions; their form and their physiological requirements were gradually changed, until finally in the course of time they could not exist elsewhere. They were then strictly parasitic.

So far has this development and adaption to the conditions of environment gone that we find different species and varieties of lice, of mites, and of worms living upon each different species of animals, and in most cases these parasites perish if transferred from one species of animals to another species. If, therefore, these parasites can not exist when transferred to a different species of animals from that upon which they have developed and to which they have become adapted, there is all the more reason why they can not exist in nature elsewhere than upon or within the animal body. Hence, we find animal species living as parasites upon other animals, and having no individuals of their species living a nonparasitic existence. They have developed and have been modified since they began their existence as parasites, just as the species of animals living free in nature have been modified. Consequently, if an animal becomes infected with lice or mites

at the present day it must get them from some other animal which bears them.

The adaptation and modification of the bacteria and protozoa which cause the contagious diseases has probably occurred in much the same manner as that of the larger animal parasites which we have been considering. The glanders bacillus has lived a parasitic existence in the bodies of animals of the horse kind for many thousands of years. It is no longer able to multiply or live for any considerable time in nature outside of the animal body. It is therefore a strictly parasitic organism. The bacillus of tuberculosis is even further developed as a parasite than the bacillus of glanders, as it is much more difficult to cultivate in the laboratory even under the most carefully adjusted conditions. There is no reason to suppose that any bacilli exist in nature having the same biological characteristics as have the glanders and tuberculosis bacilli.

The exact form of the rabies virus has never been satisfactorily determined, but what we know of it leads to the conclusion that it is a parasitic organism of some kind, which has been modified by thousands of years of existence within the animal body, and which has no counterpart elsewhere in nature. Inoculation with it is easy; it has specialized as to the conditions of life to such an extent that it multiplies only in the brain, spinal cord, nerve trunks, and a few glands; it can not be made to grow outside of the body by any methods now known. All of these facts indicate an obligatory parasitic existence. When or under what conditions in the prehistoric ages of the past it first became parasitic can never be known, nor can we determine at this late date how long a time was required to transform it from an organism which was only occasionally or accidentally parasitic into one which could live no other than a parasitic life. What appears certain is that for more than two thousand years rabies has been the same disease it is today; that it has been propagated by the same species of animals, manifested itself by the same symptoms, and produced the same fatal results.

It is not unlikely that other microscopic organisms will from time to time take up their habitat in the animal body and become obligatory parasites. There are a number of different bacilli now known which are capable of living in the flesh and causing fatal disease, but which only do this under accidental conditions. Among these are the anthrax bacillus, the bacillus of blackleg, the bacillus of malignant oedema, and the bacillus of tetanus, all of which are deadly in their effects on animals inoculated with them, but all of which lack some quality required for their rapid dissemination or for the ready infection of susceptible animals. Consequently, they do not usually spread from animal to animal. With slight modification the anthrax bacillus might become the most terrible of the known disease germs. But that such modifications require time and conditions not often found, is proved by the fact that though this disease has been known since the beginning of medical knowledge, the bacillus has in the memory of man made no progress as a disease-producing organism, but on the contrary appears less capable to-day of gaining entrance to the tissues than it was two or three centuries ago.

THE PREVENTION OF RABIES

It is unfortunate and inconsistent that those who pretend to love dogs most and to be most anxious for their welfare should be the ones who place

the greatest obstacles in the way of attempts to control this disease. Of all animals, the dog is most often the victim of rabies, and he suffers not only from the disease, but from the reputation of propagating it. And to make the matter worse, he is still falsely accused of being a party to the spontaneous generation of the contagion. His true friends should come to the rescue and relieve him of this incubus, which he has borne so long.

There is no contagious disease more easily eradicated than rabies. As the disease can only arise from contagion, and as the contagion is practically always transferred by a bite, and as the animals which do the biting are almost always dogs, it suffices to stop the dogs from biting for a period sufficient to cover the incubatory stage of the disease, that is, for about a year, in order to stamp out the malady. As a scientific problem, therefore, the eradication of rabies is a very simple matter, but as a practical question it is one of the most difficult which confronts the sanitarian. And this difficulty arises not from anything inherent in the work to be accomplished, but in the opposition of those who own and keep dogs. The measures necessary for the eradication of rabies are two in number: (1) Destruction of worthless, ownerless, and vagrant dogs; (2) efficient muzzling of all dogs which appear upon the streets or in public places.

The dog tax and license are efficient means of securing the destruction of worthless dogs, and if these are combined with the requirement that every licensed dog shall wear a metal tag of special form, the ownerless and vagrant dogs may be at once recognized and captured. As more than half of the dogs in the country are worthless or ownerless, this measure at once reduces very largely the canine population, and correspondingly lessens the material upon which the disease can work, as well as the chances of infection.

An efficient muzzle prevents dogs from biting, and, therefore, prevents the propagation of rabies. Muzzling is for this reason the most effective measure with which to combat the disease. Public sentiment in this country is generally against muzzling, and this measure is either not adopted or it is so imperfectly enforced as to have no other effect than to irritate the super-sensitive dog owners. In Germany and Great Britain muzzling has had an immediate and most marked effect in eradicating the contagion.

The effect of these measures depends entirely upon the energy and thoroughness with which they are enforced. There should be a dog-catching force adequate to the work, whose duty it should be to seize all dogs found in public places without tags and all dogs wearing inefficient muzzles, and if these animals are not redeemed within a specified time to destroy them. Usually the requirements for tags and muzzles are evaded by a large number of dog owners, and it is common to see on the streets of cities, where they are supposed to be in force, numerous dogs without tags, and even a greater number with muzzles that are of no value as a means of preventing the animal from biting. This is due to the fact that there is seldom a sufficient force of dog catchers, and that the sympathy of the community is with those who violate the law rather than with those who endeavor to enforce it.

When there is an unusual prevalence of rabies among dogs, or when, unfortunately, some person contracts the disease, particularly if that person happens to be well known or prominent in the community, there may be a temporary exhibition of strict and energetic enforcement of the regulations.

But as soon as the public alarm subsides the efforts are relaxed, the dog catcher disappears, the dogs are seen upon the streets with or without tags and muzzles, and all things go on as before the panic occurred. While the number of dogs is thus periodically reduced somewhat, it is seldom that this reduction is sufficient to have much effect upon the propagation of the disease. It is probable that the tendency at such times to keep dogs confined in order to prevent them from being seized has more influence in arresting the propagation of rabies than has the mere reduction in numbers.

In nearly all cases when reliance has been placed upon the one measure of reducing the canine population the result has been unsatisfactory. What other disease would we attempt to stamp out by simply killing off one-fourth or one-third of the animals of the species affected? And if this measure is not efficient with other diseases, why should we expect it to be with rabies? It appears self-evident from a sanitary point of view that there should be some direct measures instituted to prevent the propagation of the contagion. Such a measure would be the quarantine and confinement of all dogs for a sufficient time to cover the ordinary incubation period of rabies. As the enforced and continuous confinement of dogs without open-air exercise for a prolonged period may be detrimental to the animals, they may be allowed in public places under such conditions as will absolutely prevent them from biting, that is, the animals should wear an efficient muzzle, or they should be muzzled and led in leash. As rabies is only propagated in nature by biting, such a regulation, if thoroughly enforced, would at once stop the transmission of the disease and soon lead to its disappearance. When this measure is inaugurated, however, it is at once opposed by a large class of citizens who hold it to be cruel and unnecessary. Some muzzles are unquestionably cruel, but a properly made muzzle is not cruel, nor does it greatly inconvenience the dog after he becomes accustomed to it. The authorities should, therefore, prescribe the kind of muzzle to be used, and should select one which covers the mouth with a wire cage so as to prevent biting without interfering with the movements of the jaw and the ingestion of liquids.

There have been many who have denied the utility of the muzzle, the strongest argument being that dogs do not wear it at home, and when they develop rabies and escape it is always when they are unmuzzled. Admitting the force of this argument, it is nevertheless a fact that if all dogs were required to be muzzled when in public places, the appearance of a dog without a muzzle would at once attract attention, leading persons to avoid it and causing its early seizure by the authorities. Children might be instructed that an unmuzzled dog was dangerous and that they should keep at a distance from it, and especially that they should never touch or fondle such an animal.

The results which have been obtained by muzzling justify its enforcement wherever there is an outbreak of rabies. Most of us have heard of the experience of Berlin with this measure about the middle of the century. From 1845 to 1853 there were received at the Berlin Veterinary School 278 rabid animals. This is an average of 35 a year. From March, 1852, to the same month in 1853 the number was 82, and from March, 1853, to the end of July there were 37 more. On July 20 it was ordered that the use of the muzzle should become general. From July to the close of the year but 6 cases were admitted. Only 4 cases were observed in the whole city during 1854, and

but a single case in 1855. For the seven years following there was not a single case recorded.¹

While some have attributed the disappearance of rabies from Berlin at the time mentioned to other causes, muzzling has been adopted in Germany as the principal reliance in repressing this disease. It appears that the number of cases of rabies in Berlin increased progressively after 1863, until in 1868 it reached 66, declining again to 7 in 1870, only to increase in 1872 to 69. In 1875 a law was passed, extending to the whole of Prussia, which provides that all dogs suspected of rabies shall be immediately killed, as also all animals which it is evident have been bitten by rabid animals, and that all dogs in a district which has been infected by an outbreak of rabies shall be confined, or, when abroad, both muzzled and led. The technical section of the veterinary board in Berlin are of the opinion that the passing of this law, and not alone the existence of the muzzling order in that city, is the cause of the extinction of rabies in Berlin. No case has occurred there since 1883.*

Consul-General Mason reports from Berlin to the State Department that "in Berlin, Frankfort, and, so far as I know or can ascertain, in all cities and large towns in Germany, dogs are required to be muzzled whenever they are on the street or public place, and this regulation is enforced in cities even when the dog is led or held in leash by the owner, or is harnessed for working purposes to a cart or other vehicle."

Fleming states that "in Vienna rabies was entirely suppressed by eighteen months of stringent muzzling, but that in 1886 the muzzling order was rescinded and badges had to be worn on dog collars instead; in the following half year there was only one case of the disease, but in the next half year rabies became epidemic, and the muzzle had again to be worn, with the result that the malady soon subsided and disappeared."

In Holland, before 1875, rabies was prevalent to a very serious extent, but in June of that year the use of the muzzle was ordered, with the result that in the autumn the number of cases fell to forty-one; in the next whole year there were fifty-five cases; in 1877 there were fourteen; in 1878 there were four, and in 1879 there were three. These, and the cases which have since been reported, occurred only on or near the frontier of Belgium, in which country the muzzle is not in use, though rabies is always prevalent.

In the Grand Duchy of Baden during the years 1871, 1872, 1873, 1874, and 1875 the number of cases of rabies was, respectively, 18, 37, 37, 50, and 43. Then the muzzle was rigorously applied, and in 1876 there were twenty-eight cases; in 1877, three; in 1878, four; in 1879, two; in 1880, two; in 1881, two; in 1882, three; in 1883, two; in 1884, two. Since that year only one case has been observed, and that was a dog from Metz contaminated before its arrival in Baden.

In Sweden rabies was at one time a somewhat common disease, and from eight to ten people died annually from hydrophobia; but muzzling being enforced, and the importation of dogs prevented, rabies has been unknown for many years, and no deaths from hydrophobia have occurred since 1870.

1. Renault, cited by Bouley, in *Rapport sur la Rage*, *Bul de l'Acad. de Med., Paris*, 1863, p. 725. Fleming: *Rabies and Hydrophobia*, p. 365.

2. Fleming: Paper read before the Seventh International Congress of Hygiene and Demography, London, 1891.

3. Consular Reports, June 19, 1900.

The value of the muzzle in suppressing rabies has been perhaps best demonstrated in London on several occasions, and specially in 1885. In the previous years hydrophobia had increased to a very alarming extent in England, and no steps worthy of note had been taken to check the mortality. For London alone in that year no fewer than twenty-seven deaths were reported as due to the bites of rabid dogs. A muzzling order was then enforced, and at the end of 1886 not a death was recorded. Unfortunately, the order prescribing the use of the muzzle was then rescinded, and in a few months a case of hydrophobia occurred in the south of London, soon to be followed by others, and in 1889, ten deaths were registered. In July of that year the muzzling order was again issued and stringently carried out, and rabies and hydrophobia once more disappeared.*

In the whole of Great Britain the results from enforcing the muzzling order have been phenomenal, both in the opposition encountered by the authorities and in the successful eradication of the disease. The number of rabid dogs officially reported was, in 1887, 217; 1888, 160; 1889, 312. In the last-mentioned year muzzling was adopted, and the number of cases fell to 128 in 1890, 79 in 1891, and 38 in 1892. Then, owing to persistent opposition, muzzling was stopped, and the effect of withdrawing this measure was at once seen in the increase of rabies. In 1893 there were 93 cases; in 1894, 248, and in 1895, 672. At this point, owing to public alarm, muzzling was again enforced, reducing the number of cases in 1896 to 438, in 1897 to 151, in 1898 to 17, in 1899 to 9. As no case was discovered from November, 1899, to March, 1900, it was believed by the veterinary officer that the disease had been extinguished from Great Britain.

These examples are certainly sufficient to demonstrate the value of muzzling as a means of repressing rabies, and it may be added that in countries like France and Belgium, where muzzling has not been adopted, the disease continues to prevail to a very serious degree.

* *Fieming*: Paper before Seventh International Congress of Hygiene and Demography, 1891, quoted by committee on public health of the Medical Society of the District of Columbia, *Bul. No. 25*, Bureau Animal Industry.

XVII

SMALLPOX IN IOWA

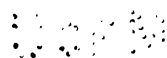
In the biennial report of this Board for the period ending June 30th, 1899, it was shown that there had been two hundred and forty-nine cases of smallpox in the state with two deaths. At the close of this biennial period there were in the state cases of smallpox at Cresco, Rome, Orleans township, Winneshiek county, Le Claire, and Iowa City—the last case being reported from that place June 26th by Dr. Shrader.

No cases were reported in July, but August 10th Dr. Shrader reported two more cases in Iowa City. This was followed by a letter from Dr. J. F. Herrick, of Ottumwa, reporting one case there, and October 21st Dr. C. W. Stewart reported a case in Washington, an importation from Albert Lea, Minnesota. These were but fitful murmurings—the forerunners of the epidemic that began in a graders' camp near Storm Lake, and was reported to the Secretary of the State Board of Health, November 9th.

The information first came from Dr. Reynolds, of Chicago, notifying the Secretary that a party had arrived there from Storm Lake with well developed smallpox. The authorities at Storm Lake were disposed to deny its existence. Dr. L. M. Johnson, Health Officer, telegraphed November 15th, "No case of smallpox here," and on the next day the Secretary received a joint letter from the Mayor and Health Officer stating that there was "No case of smallpox in or near Storm Lake and that there had been none." In the meantime another telegram was received from Dr. Reynolds, of Chicago, stating that a second case had gone there from Storm Lake and justly complaining of the lax methods prevailing there. Dr. R. E. Conniff, of Sioux City, member of the State Board of Health, was asked by the Secretary to make a personal visit to this point and ascertain and report the facts, which he did at once, and reported from there the morning of November 17th as follows: "Five cases of smallpox in Storm Lake, numerous exposures, source of infection unknown. Suspected cases quarantined. I fear a bad mess."



No. o.—Iowa Case. Smallpox.



1900

For the month there were reported to the Secretary cases at Storm Lake, Sioux Rapids, Marathon, and Province township, all in Buena Vista county; also at Corning, Northwood, Alvord, Coalfield, and Silver Lake township, Lyons county.

From this beginning the disease spread from point to point by exposure to persons affected at the places named above, and by persons coming into the state from Minnesota, Nebraska, and other places until up to the close of this report there is scarcely a county in the state that has not had one or more cases.

Where the character of the disease was promptly recognized and reported and the local health officers promptly and efficiently resorted to vaccination, isolation, quarantine, and disinfection the disease seldom got beyond the family or premises first infected.

Unfortunately, because of its mild type and modified form there were many physicians who failed to recognize its true character; or if recognizing it, for questionable reasons, neglected or refused to report it for quarantine. A number of these physicians after witnessing the spread of the disease in severer type by persons exposed to their patients, and after having had the real character of the disease specifically pointed out by the physicians of acknowledged skill who were called in consultation still persisted that they were right and that everybody else was wrong.

There is no doubt whatever that hundreds of cases occurred in Iowa and that valuable lives were lost because of such ignorance and obstinacy, and the State Board of Medical Examiners should have authority, if it does not now have it, to suspend from practice or to permanently revoke the certificates of those thus offending. It must be admitted, however, that among this number there must have been some who had never seen a case of smallpox and who in failing to recognize the disease were honestly mistaken. All such, however, were very free to acknowledge their mistake and to remedy it as far as possible.

But physicians were not alone to blame for the wide prevalence of this disease. Indeed, but a small per cent. of physicians seeing these cases failed to recognize and report them. Local boards of health were, in too many instances, reluctant to take proper cognizance of the cases reported, and to adopt and enforce measures required to prevent its spread. They too often had an idea, or acted as if they had such an idea, that to admit its presence and to inaugurate protective measures would advertise

their misfortune and thus injure if not paralyze business. A more serious mistake could not well occur. It has been over and over observed that where a place has been unfortunate enough to have such an outbreak occur, if the local authorities at once adapted and enforced rigid preventive measures it inspired confidence, and there was no interruption to business whatever; but where an effort was made to conceal it the most extravagant reports were hatched up and circulated and the individuals and surrounding towns were disposed to boycott the place and business was badly crippled in consequence.

Again, local boards have for mistaken commercial reasons been disposed to ignore the presence of contagious diseases because preventive measures meant heavy expenditures. There could not, however, have been a more expensive policy pursued. Proper measures promptly adopted and faithfully maintained would have perhaps restricted the infection to the premises first quarantined, whereas the neglect often caused the erection of detention hospitals, the employment of trained nurses and heavy expenses for medical attendance, supplies, etc.

Again, the local newspapers in many places have greatly discouraged and embarrassed local boards by discrediting the diagnosis of intelligent physicians and by bringing ridicule upon efforts on the part of local boards to prevent the spread of the disease. They have too often prominently endorsed and commended the course of physicians, however ignorant, and whom they would under no circumstances employ in their family, who denied the existence of smallpox even though these same physicians had not seen one of the cases in question. In every considerable town one or more physicians may be found who loudly declare through the "press" over their signature or by "interview" not only that there is not, and has not been, a case of smallpox in their locality, but that in their opinion there has not been one in the State. These physicians are too often taken up by the local press presumably in the interest of economy and business, and their opinion is declared to be of more weight than that of all the other physicians combined.

It would be interesting if there could be presented herewith a reliable statement as to the number of cases together with the number of deaths that have occurred in the State during this biennial period.

In order to get as correct data for this report as possible, the



IT

Secretary sent to every city, town, and township clerk in the State the following circular letter:

IOWA STATE BOARD OF HEALTH

OFFICE OF THE SECRETARY

DES MOINES, June 30, 1901.

To the City, Town, and Township Clerks of Iowa:

Section 2571, the Code defining the duties of the local boards of health, says: "And through their physician or clerk shall make general report to the State Board of Health at least once a year, and *special reports when it may demand them*, of its proceedings *and such other acts as may be required*, on blanks furnished by them and in accordance with instructions from it."

As the "health officer" or physician of the local board does not have the data upon which to make such a report, the State Board requires it to be made by the Clerk.

The Secretary of the State Board of Health is required to make to the Legislature through the Governor a report for the biennial period ending June 30th, every odd year. The Code requires that one part of the report shall contain "information concerning vital statistics." These statistics the Secretary can only obtain through the Clerks of local boards of health—so far as infectious diseases are concerned.

There is enclosed herewith a postal card which you will please fill out and return on or before the 10th day of July, *proximo*. If there have not been within the two years ending June 30th, any of the diseases named, state that fact upon the card and return it.

If you cannot give exact figures, make them as nearly correct as possible. This is a matter of great importance to this office and is a part of your sworn duty, and it is to be hoped that no one will neglect to report promptly.

In signing the card the City or Town Clerk shall give the postoffice address, and the Township Clerk, in addition, his township and county.

Very respectfully,

J. F. KENNEDY.

The circular called for reports of diphtheria, scarlet fever, and smallpox—three quarantinable diseases—for the biennial period ending June 30th, 1901. Inasmuch as all cases quarantined are supposed to be recorded with the city, town, or township clerk, it was thought the returns from these officers might show, at least approximately, what the facts were.

Accompanying these circulars was a postal card with the address of the Secretary of the State Board of Health printed on; and also so printed that the clerk had nothing to do but fill up the blank spaces indicated and sign—giving name of clerk, post-office address, and locality reporting.

There were twenty-three hundred of these cards and circulars sent out. Of this number, 1,194 were returned—433 of these fifty-six towns and 377 townships, either being blank or reporting no diseases named.

The 761 towns and townships reporting outbreaks of diphtheria, scarlet fever, and smallpox furnish facts for thoughtful consideration.

Van Buren is the only county in which one or more cases of diphtheria have not been reported.

Every county has had some cases of scarlet fever.

Adams, Delaware, Grundy, Jackson, Louisa, Mills, and Warren are the only counties reported as not having had a case of smallpox for the entire years of 1899 and 1900.

The 761 reports received that are not blanks show that during these two years there were in the entire State, covering about one-third of the towns and townships of the State, 1,762 cases and 315 deaths from diphtheria; 3,403 cases and 112 deaths from scarlet fever, and 4,792 cases with 24 deaths from smallpox.

These reports do not even approximately give the correct data as to places in the counties where these diseases occurred or the number of cases.

There is no report from the city of Des Moines, and there are other large towns that have failed to report where it is known that the disease existed and was quite widespread.

If all towns and cities as well as townships in Iowa had as faithfully reported their cases as Boone, Webster City, Davenport, Clinton, Ottumwa, and Burlington there would have been a pleasure in tabulating the results.

It may be interesting to know how many local boards in Iowa have had to quarantine for diphtheria, scarlet fever, and smallpox as shown by the responses to the cards referred to. The returns show that the following number of cities, towns, and townships had outbreaks of quarantine diseases during 1899 and 1900: Diphtheria, 336; scarlet fever, 500; and smallpox, 390. If the 1,206 local boards to whom cards were sent and not returned had reported in proportion as the above, the showing, it would seem, ought to open the eyes of the people to the wide prevalence of three diseases that are communicable and hence preventable or at least capable of restriction.

The deaths reported from these three diseases as above stated were diphtheria, 315; scarlet fever, 112; and smallpox, 24—in all 451. It is fair to assume that the above figures do not represent more than 50 per cent. of cases and deaths that have actually occurred within the biennial period.

Is there not here food for serious thought? A good many persons are to blame for this fearful loss of life and waste of



No. 3.—Iowa Case. Smallpox.



property from causes that ought in a great measure to have been avoided. The statute relating to public health and the rules and regulations of the State Board predicated thereon are most beneficent in design, and if carefully carried out would have saved much bereavement and many heartaches. Will not the presentation of these facts, meagre as they are, as far from presenting the ravages of these diseases as they do, lead to a better and more cheerful compliance in the future? And will not the city and township clerks throughout the State keep more faithful records so that when called upon again more reliable data may be obtained?

Will not the legislature provide such further legislation as will in the future insure more faithful and reliable returns?

The following table presents a detailed report, by counties, of the number of cases of smallpox occurring in the State and the deaths therefrom for the years included in this report:

Report of cases and deaths from smallpox in the different counties of the state as shown by official reports from city, town and township clerks for the biennial period ending June 30, 1901:

COUNTIES.	1899-1900—cases.	1900-1901—cases.	Total cases.	1899-1900—deaths.	1900-1901—deaths.	Total deaths.	COUNTIES.	1899-1900—cases.	1900-1901—cases.	Total cases.	1899-1900—deaths.	1900-1901—deaths.	Total deaths.
Adair.....	13	44	57	..	..	..	Jefferson.....	..	53	53	..	2	2
Adams.....	..	..	..	..	..	..	Johnson.....	2	2	2	..	4	4
Allamakee.....	1	..	..	..	..	..	Jones.....	..	6	6	..	..	..
Appanoose.....	1	394	395	1	1	1	Keokuk.....	7	103	110	..	..	..
Audubon.....	..	19	19	..	..	..	Kossuth.....	..	33	33	..	..	..
Benton.....	..	135	135	1	1	1	Lee.....	..	4	4	..	..	..
Black Hawk.....	..	86	86	..	..	..	Linn.....	4	19	23	..	..	..
Boone.....	77	139	216	..	..	..	Louisa.....	..	..	..	..	..	..
Bremer.....	..	43	43	..	..	..	Lucas.....	..	75	75	..	1	1
Buchanan.....	3	4	7	..	..	..	Lyons.....	22	11	33	4	..	4
Buena Vista.....	26	40	66	1	1	1	Madison.....	10	3	13	..	..	..
Butler.....	2	5	7	..	..	..	Mahaska.....	10	24	34	..	..	..
Calhoun.....	..	39	39	..	..	..	Marion.....	1	32	33	..	..	..
Carroll.....	1	36	37	..	..	..	Marshall.....	93	23	116	1	..	1
Cass.....	1	106	107	..	2	2	Mills.....	..	..	..	..	..	..
Cedar.....	..	3	3	..	..	..	Mitchell.....	11	4	15	..	..	..
Cerro Gordo.....	..	10	10	1	1	1	Monona.....	83	98	181	1	..	1
Cherokee.....	..	35	35	..	..	..	Monroe.....	9	70	79	..	..	..
Chickasaw.....	..	79	79	..	..	..	Montgomery.....	..	38	38	..	..	..
Clarke.....	..	2	2	..	..	..	Muscatine.....	..	2	2	..	..	..
Clay.....	..	48	48	..	..	..	O'Brien.....	..	31	31	..	..	..
Clayton.....	..	13	13	..	..	..	Osceola.....	..	4	4	..	..	..
Clinton.....	18	61	79	..	..	..	Page.....	..	2	2	..	..	..
Crawford.....	..	28	28	..	..	..	Palo Alto.....	..	14	14	..	..	..
Dallas.....	..	6	6	..	..	..	Plymouth.....	2	6	8	1	..	1
Davis.....	..	67	67	1	1	1	Pocahontas.....	..	11	11	..	..	..
Decatur.....	..	13	13	..	..	..	Polk.....	67	22	89	..	..	..
Delaware.....	..	..	..	..	..	..	Pottawattamie.....	2	29	31	..	..	..
Des Moines.....	..	3	3	..	..	..	Poweshiek.....	10	63	73	1	1	2
Dickinson.....	1	6	7	..	..	..	Ringgold.....	..	4	4	..	..	..
Dubuque.....	..	8	8	..	..	..	Sac.....	..	28	28	..	..	..
Emmet.....	..	92	92	..	..	..	Scott.....	8	78	86	..	1	1
Fayette.....	..	49	49	..	..	..	Shelby.....	1	10	11	..	..	..
Floyd.....	10	27	37	..	..	..	Sioux.....	..	39	39	..	1	1
Franklin.....	1	1	2	..	..	..	Story.....	20	25	45	..	1	1
Fremont.....	..	26	26	1	1	1	Tama.....	1	5	6	..	..	..
Greene.....	..	6	6	..	..	..	Taylor.....	..	51	51	..	..	..
Grundy.....	..	..	..	..	..	..	Union.....	1	97	98	..	..	..
Guthrie.....	..	228	228	..	..	..	Van Buren.....	13	30	43	..	..	..
Hamilton.....	13	420	433	..	..	..	Wapello.....	1	136	137	..	..	..
Hancock.....	1	1	2	..	..	..	Warren.....	..	..	..	..	..	..
Hardin.....	6	14	20	..	..	..	Washington.....	..	5	5	..	..	..
Harrison.....	..	40	40	..	..	..	Wayne.....	..	10	10	..	..	..
Henry.....	2	8	10	1	1	1	Webster.....	43	161	204	..	..	..
Howard.....	15	13	28	..	..	..	Winnebago.....	..	43	43	..	..	..
Humboldt.....	..	156	156	..	..	..	Winneshiek.....	6	7	13	..	..	..
Ida.....	..	3	3	..	..	..	Woodbury.....	..	4	4	..	..	..
Iowa.....	6	15	21	..	..	..	Worth.....	2	1	3	..	..	..
Jackson.....	..	..	..	..	..	..	Wright.....	7	3	10	..	1	1
Jasper.....	12	48	60	..	..	..	Total.....	646	4 144	4 794	12	13	25



No. 4.—Iowa Case. Smallpox.

The exceedingly mild character of the disease produced in a great many cases a mistake as to its true character, and in many places only where severe cases occurred were they reported as smallpox. This characteristic of the disease was not confined to Iowa. In all the states of the Union, as well as abroad in many places, the disease has presented the same features. For the information of the people the State Board of Health prepared a circular (No. 8), on smallpox, many copies of which were sent wherever smallpox was known or suspected to exist. This circular is reprinted in the appendix of this report.

In addition to this circular the members of the Board and its Secretary visited many localities, especially where there was a dispute as to the true character of the disease, or where it was difficult to enforce quarantine regulations. All such visits resulted in much good by way of establishing the diagnosis, and helping the local authorities in the discharge of their duties.

A physician of this state, who subsequently unfortunately killed himself by taking by mistake a dose of his own medicine, conceived the idea that the disease was "Yaws", though he had never seen a case of this tropical affection. In a short time other physicians for various reasons unwilling to call it smallpox took up this name and some of the newspapers were prompt to accept this diagnosis. In order to show the fallacy of this claim the Iowa Health *Bulletin*—the official organ of the State Board of Health—in the June (1901) number gave the following description of yaws since which time no one has had the temerity to speak of this disease in connection with the eruptive disease so prevalent all over the country:

YAWS OR FRAMBOESIA.

As there are a couple of physicians in Bloomfield who are seeking to know the truth and who report that they have a disease that they cannot call smallpox, which for want of a better name they have been calling "Yaws," we have thought that we should if possible show at least why this prevalent disease should *not* be called "Yaws."

We have been disappointed somewhat in our search for information in this point.

The following leading medical text-books make no allusion to the disease, while they do mention pretty extensively even so simple a disease as mumps.

Pepper's SYSTEM OF MEDICINE, Loomis and Thompson's AMERICAN SYSTEM OF MEDICINE; Bartholow's PRACTICE OF MEDICINE; Watson's SYSTEM OF MEDICINE; and Ziemssen's CYCLOPEDIA OF THE PRACTICE OF MEDICINE. We have found the disease treated of somewhat extensively in Shoemaker's DISEASES OF THE SKIN; Reynold's SYSTEM OF MEDICINE; and by the medical editor of the BRITISH ENCLYCLOPEDIA.

Several also of our medical directories treat of it briefly.

Gould's NEW MEDICAL DICTIONARY says: "Framboesia Yaws, a contagious disease of the skin characterized by dirty or bright red raspberry-like tubercles, appearing usually on the face, toes, and genita' organs."

We have seen no cases like this, nor have those described as Yaws in Monroe and Taylor counties in any way resembled it.

Thomas' MEDICAL DICTIONARY: "Framboesia—the Yaws—a contagious disease occurring in the West Indies, Guiana, and some parts of Africa, characterized by tumors resembling raspberries."

The next edition of this dictionary should include Monroe county and Taylor county, Iowa. In the latter county Dr. A. W. Fees, attorney of Lenox, says he saw and treated sixty cases of Yaws.

Dunglison's MEDICAL DICTIONARY: "Framboesia, hard papillary growth as in lupus, syphilis, sycosis, etc. Yaws, epian, pian. Disease of the Antilles and of Africa, characterized by tumors, of a contagious character, resembling strawberries, or champignons, ulcerating and accompanied by emaciation."

The cases seen by the Monroe county doctor, Brunt, and the Taylor county doctors, so far as described by those having seen them, though far out of the latitude where Yaws has heretofore been known to exist, bear a striking resemblance to the descriptions given above—in one particular. They are alike "contagious."

Quain's DICTIONARY OF MEDICINE: Article by Erasmus Wilson: "Framboesia consists of an eruption of yellowish or reddish yellow, which gradually develops into a moist exuding fungus without constitutional symptoms, or with such only as result from ulceration and prolonged discharge, debility and prostration. * * * This disease is peculiar to the African race." * * * The *period of incubation* of the poison ranges from *three to ten weeks*. * * * The *ordinary duration* of Framboesia extends from *two to four months*, but frequently this period is prolonged to one or several years. When it is irregular in its development the constitution is apt to suffer, ulcers form around the joints, the joints swell, the discharge from the ulcers is excessive, and the patient is crippled for life, or in some instances relieved only by death."

The people of Iowa should be devoutly thankful that the Yaws(?) as reported at Coalfield and in Taylor county possessed no such characteristics.

ENCYCLOPEDIA BRITANNICA: "Yaws is the name in use in the British West Indies and on the west coast of Africa for a peculiar disease of the skin in negroes. * * * Previous to the eruption there may or may not be any disorder of the health. In children (who form a large part of the sub-



No. 6.—Iowa Case. Smallpox.

jects of Yaws) there will probably be rheumatic pains in the limbs and joints, with languor, debility, and upset of the digestion; *in adults* of ordinary vigor *the eruption is often the first sign*, and it is attended with few or constitutional troubles. The eruption begins as small pimples like a pin's head, smooth and nearly level with the surface; they have a little whitish speck on their tops, grow rapidly and reach the size of a sixpence or shilling. The pustules then break and thick viscid ichor exudes and dries upon them as a whitish slough, and around their base a yellow brown crust. Beneath the whitish slough is the raspberry excrescence or Yaw proper—a reddish fungus with a nodular surface. Hairs at the seat of the yaw turn white. * * * If the patient be of sound constitution and good reaction, the Yaws may reach the full size of a mulberry in a month, in which case they will probably be few; but in persons of poor health they may take three months to attain the size of a wood strawberry. * * * Six weeks is the average time in a good case, from the first of the eruption to the fall of the excrescences; in such regular cases a scar remains; it may be for many months darker than the rest of the negro skin. But the disease is often a more tedious affair, the more protracted type having become common in the West Indies of recent years. In such cases the eruption comes out by degrees and as if with difficulty, crop after crop; foul excavating and corroding ulcers may remain, or a limb may be in part seamed and mutilated by the scars of old ulceration.

We cannot but rejoice that the Yaws (?) in Iowa was so different in type and that so few who were vaccinated against smallpox took the Yaws. We feel that with the foregoing we have almost raised a reasonable doubt as to the eruptive disease called by so many intelligent physicians all over the country smallpox being Yaws, or bearing any striking resemblance thereto. We desire, however, to produce such a preponderance of evidence that even the most obtuse may be thoroughly convinced. With this view we turn to a couple of recent text-books of good repute—one upon diseases of the skin, the other upon general medicine and with these we rest our case—well assured that if these do not convince nothing else will.

DISEASES OF THE SKIN—Shoemaker. "Framboesia, also termed Yaws and Pian, is a cutaneous malady, characterized by the formation of macules, papules, tubercles, and pustules * * * The eruption consists at first of a variable number of macules, which become elevated and transformed into papules or tubercles. * * * They gradually increase in size, and become covered with small, flat, red elevations, presenting a raspberry-like appearance. Some of the lesion, coalesce, forming large fungoid masses. After a time the lesions become fissured or abraded, and a semi-purulent substance oozes out. There is no itching at any time. The *period of incubation* of this disease is said to be *from six weeks to two months* * * * *The affection pursues a protracted course and may, if untreated remain for years.* * * * Framboesia is produced by contagion and is *most frequently propagated by sexual intercourse.*

REYNOLDS' SYSTEM OF MEDICINE—Hartshorne, Vol. 3, page 952: "The Yaws is a contagious disease, appearing once only during life, running a definite but *chronic course* and *characterized by* the eruption of *a number of raspberry-like tumors* on certain parts of the skin. * * * The disease is indigenous in Central Africa (where it is known as the Yaws), hence it has been conveyed to the West Indies, (where it is called Pian). * * * The period of incubation of the disease is about two months. It appears first as small red points like flea bites, these soon rise into pimples, which extend till they attain on *an average of one-half an inch in diameter*. As these tubercles enlarge their surface becomes covered with a scab. Beneath the seat a fungous growth consisting of florid prominent granulations springs up. From this fungus growth the disease derives its name Framboesia (*fram-boise, a raspberry*). Two or three months elapse before the red point attains the raspberry-like condition. * * * The course of the disease is very slow, extending in the case of adults *generally over a year*, or even a year and several months; *in children its duration may be stated at seven or eight months*. Framboesia cannot be mistaken very well for any other disease."

In the foregoing quotations the italics used are our own. We would have been glad had space premitted to have reproduced some other very interesting facts relative to this peculiar, but fortunately to us unknown disease. We would doubt the propriety of giving any space at all to a disease never known in this latitude, and only claimed by one author to have ever appeared in the most southern part of the United States, were it not that some physicians in Iowa, actually reported from quarantine cases of Yaws, in at least two counties in the state and that other physicians unwilling to call the disease smallpox stated that for the lack of a better name they called it "Yaws." It is our deliberate judgment in view of the descriptions of the Yaws as given above and as a result of extended personal observations in various parts of the state that with no consistency whatever can it be called Yaws. This disease and Yaws have but one common character—they are both contagious.

MODIFIED SMALLPOX

The Secretary takes great pleasure in presenting herewith, by permission of the Illinois State Board of Health, an open letter addressed to the Board by James Nevins Hyde, A. M. M. D., Professor of skin diseases in Rush Medical College, "Touching the Symptoms and Diagnosis of the Epidemic of Modified Smallpox Prevalent in some Portions of the United States."

The reputation and professional ability of Prof. Hyde and the scientific and yet untechnical style of speech in his "Letter"



No. 5.—Iowa Case. Smallpox.

are such that the vexed question of diagnosis ought to be satisfactorily solved even by an intelligent layman. No educated physician should be mistaken after carefully reading it.

The fact that Prof. Hyde treats the disease as "Modified Smallpox" should not minify in the least the importance of preventive measures. The following from our leading text-books show that the only safety is in such restrictive measures as vaccination, quarantine, isolation, and disinfection.

"The infecting source bears no relation to the resulting disease; a mild case may and often does give rise to a severe one".—*Reynolds' System of Medicine*.

"Even the mildest form of modified smallpox in one person may cause pure hemorrhagic smallpox in another and *vice versa*"—*Allbutt's System of Medicine*.

"It must not be forgotten that an unprotected person may contract a very virulent form of the disease from the mild varioloid."—*Osler's Practice of Medicine*.

"The degree of mildness or severity of a case does not influence that of another caused by it, the severest cases being at times followed by the mildest forms, and *vice versa*."—*Tyson's Practice of Medicine*.

"There is no relation between the severity of the type of the disease in the individual who is the source of the infection and in the individual who receives it. The lightest case may cause the most malignant, provided the susceptibility or predisposition of the victim who receives the infection is strong. On the other hand, the most severe confluent or malignant case may give rise to a very mild attack in a person whose susceptibility of predisposition is slight."—*Twentieth Century Practice of Medicine*.

AN OPEN LETTER TO THE STATE BOARD OF HEALTH OF ILLINOIS BY JAMES NEVINS HYDE, A. M., M. D.

GENTLEMEN,—An epidemic disease is prevalent at this season in certain portions of this and other states of the Union, which has awakened both among the laity and among men of the medical profession, no little discussion and some controversy. The question of the nature of the malady has been debated alike by men of science, by editors of daily papers, and by the victims of the disorder, who, it must be admitted, have a special interest in knowing the nature of the affection from which they have suffered. As I have had the opportunity of examining with care a number of the victims of this disease, both in this state and elsewhere, and last in an Illinois city, where I was given, by the courtesy of the mayor, an opportunity of observing a group of selected cases, I have ventured to address to your honorable body this open letter. It is my purpose avoiding, as far as may be, the technical language of science, to set forth in simple terms the ascertained facts respecting the disease under consideration. I am entertaining the hope, however faint of realization, that some fair-minded editors of daily journals in the smaller towns of Illinois, after reading these pages, may be persuaded to consider the subject from a different viewpoint from that which they have heretofore assumed. If I might even make shift to

gain the ear of a few sensible men and women, not either editors or physicians, who would listen without passion or prejudice to what is here set down, I should feel rewarded for my trouble. Since the members of your Board and hundreds of trained physicians throughout our state and country are well versed in all these problems, I have written, not for you nor for them, but under cover of your name and theirs in the hope of helping others.

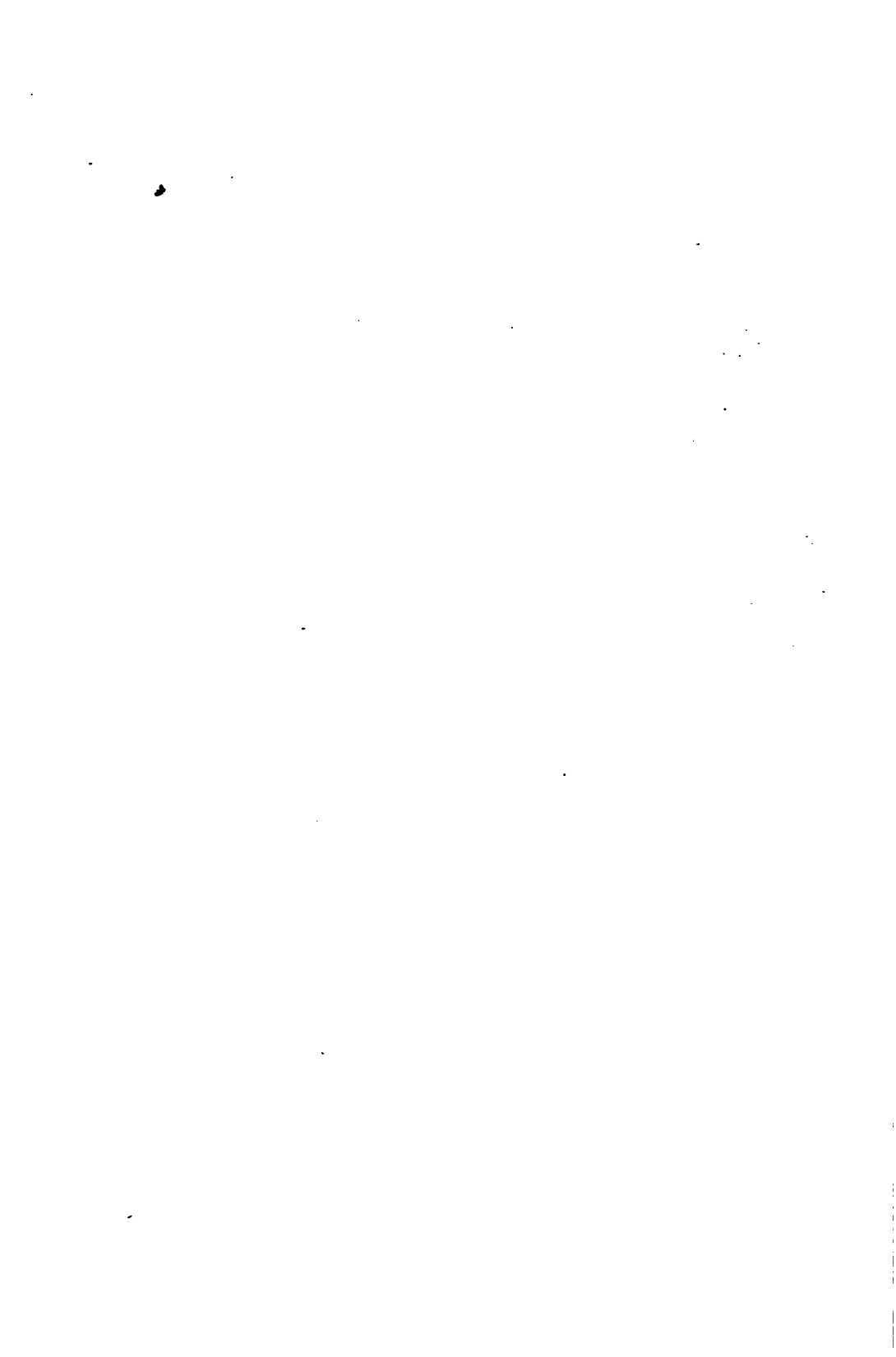
The conservation of the health of the people is concerned with problems which interest all alike and which cannot be ignored by a few without danger to all. Springfield and Chicago have as great and vital an interest in the well-being of Aurora, Peoria, and Dixon as have these towns in the health of the people of Chicago and Springfield. What damages one is harmful for all. We are tied together by indissoluble bonds. Surely in this day when the men of the North and of the South are forgetting their old differences, when our brothers from all parts of a common country are shedding their blood in defense of our flag, when the Nineteenth is slipping into the Twentieth century, and there is promise in the future of less narrow ideals, broader aims, and of wider sympathies, men can ill afford to look in any other than an unselfish light upon questions that interest our domestic health and wealth. It is, let us admit it with thankfulness, a portent of good when the worshipers in so many of our churches Sunday after Sunday repeat the ancient formula, that "it may please God to bless and keep all His people," not those in this small town or that, not those only in the village inhabited by a few. "To keep all the people;" this is the keynote of the best work of the physicians concerned with the public health, alike in Cuba and Porto Rico, in Springfield and Chicago.

These sentences may sound like platitudes, commonplaces from the lips of a political speaker or a demagogue, but in point of fact they furnish a solid basis for the best legislation, whether in a common council or in a sedate chamber. They are often left unformulated by the busy physician because they are assumed to be granted and to require no superfluous demonstration. Yet it is not unwise when men's passions are aroused and their material interests are threatened, to repeat the text and to emphasize its importance. The family physician need not express in words his solicitude for those to whom he ministers. His personal attendance at all hours of the day and night, his obvious anxiety to relieve his patients, his gentle touch and kindly manner, prove better than words that his is not a selfish and heartless task. But it is different with the work allotted to bodies like yours. No member of your honored board is expected to make assurances to the public that your mission is one of beneficence and not of harm to the commonwealth. The very official character of your work places you, to a degree, at a disadvantage when your acts intimately concern the health and comfort and the property of those in behalf of whom it becomes your duty to interfere. For we know that pestilence destroys property; even the dread of pestilence is a source of disorder and wretchedness and waste.

It is a higher and more exacting task to prevent than to cure. But it is a task often thankless and unrewarded; indeed, in the past it has been rewarded, as among the French-Canadians in the anti-vaccination riots of Montreal, with a rain of missiles and with armed resistance of the law. The daughters of the Hebrew race in the days of their first king sang of Saul that he "had slain his thousands and David his ten thousands," but before



No. 7.—Iowa Case. Smallpox.



another century ends the plaudits of the people will be based upon the nobler truth that while medicine and surgery have saved thousands, the enforcement of public hygiene has saved its ten thousands.

An official authorized by you to inspect a portion of the State, and if possible to stamp out an epidemic threatening the health of its citizens and thus threatening the health of all the people, would be far more devilish than the Satan who Milton depicted swooping down upon the happiness of Eden, if for an instant the health officer could rejoice that the hour had struck in which he was to have the chance to close factories and schools, to quarantine men and women in their accustomed service and toil, to create disorder, and to set up barriers in the highways previously traversed by the many without let or hindrance. Rather should his visit be regarded as that of one coming like an angel of mercy to stand between the people and the pestilence, calling a halt upon its ravages and bringing order and comfort out of demoralization. Only a vast pity and profound sympathy move the trained expert who is summoned to a community suffering as have some of those lately visited by this epidemic.

The illogical and unreasoning speech and actions of those who set their faces against the regulations prescribed for the preservation of the public health, remind one of the action of the men of Devon and of Somerset described in the popular romance entitled "Lorna Doone," wherein it appears that the men of these two English counties, having set forth to exterminate the nest of the robber Doones, concluded by firing upon each other over the valley, instead of upon their actual enemies. In the discussion of the important questions at issue, how unwise to permit prejudice, passion, greed or envy dictate to the judgment. These are the enemies of a judicial spirit, of the calmness with which reasonable men consider the troubles with which they are confronted, whether in war, in financial panic, in time of earthquake, or of pestilence. This is not the season for personal attack and carping criticism. Nor is it a time in which to hurl reproaches against those who might have done differently. Nor yet is it a day for upbraiding men with charges of ignorance and error. Rather is it a time for fraternal counsel and kindly suggestion. Many experienced physicians, wholly unaccustomed to the problems connected with this epidemic, have approached it from different points of view. They have been sufficiently wise to recognize that symptoms, in some points, differed from their experience in other cases, and they have been cautious enough to make their judgment go with their findings. We should respect their prudence and admit the skill with which they have treated so many patients without grave results. Many of us could learn much from them. If they have not at first accepted the correct view, ours it is merely to ask seriously, whether there are not very strong reasons for careful consideration of the subject. The people of this State owe an immense debt to the best of their physicians. The latter are both well educated professionally and as a class exceedingly intelligent outside of their special vocation. The great majority of these long since have accepted the statements here made respecting the facts of the prevalent epidemic. None need fear that even a large minority of them will not accept, and promptly accept, the truth when it is clearly presented to them.

Even supposing that the small number of those who refuse to accept the

facts herein set forth are quite in the right, and that those who are in accord with the view here expressed are wholly in the wrong, even thus the man with common sense will pause and weigh the facts before taking his stand, less he be betrayed into remediless error. He would be a prudent engineer who in the day of a tempest listened to the warning cry even of a lunatic before taking his precious freight of living beings over a dangerous bridge.

Now, there is no controversy possible in the matter herein considered. A scientific man will not be betrayed into argument where there are not two sides to be argued. For all the days of argument and controversy in this question have long passed, and few have the time to go back half a century in order to fight over the old battles which were waged by our grandfathers of narrower observation and less extended experience. This is not a contribution to a vexed question. It is an appeal to men to recognize long established fact. There are no novel phenomena to be noted in the prevalent epidemic. Expert physicians in England, Germany, France, and Austria have long since investigated and expounded every one of the symptoms that have in this day bred so much indecision and confusion in the minds of observers.

The prevalent epidemic is one of smallpox (*variola*). To refuse to accept this fact is to be guilty of egregious folly and to commit a dangerous blunder. Fortunately, the symptoms thus far exhibited have been those of modified or mitigated smallpox. The question of chief interest thus awakened concerns chiefly the difference to be established between unmitigated, unmodified smallpox (so-called, *variola vera*) and the mild or mitigated form from which so large a number of our people have lately suffered.

The history, symptoms, and career of unmodified smallpox have been so systematically and fully recorded in medical literature that it will be needless in these pages to recount them. They are equally accessible to physicians and to laymen in the pages of the standard treatises devoted to the subject. In this connection it will be needful merely to outline in brief terms the symptoms of the mitigated form of the disease as it now epidemically prevails.

In well-marked cases the malady is usually ushered in by a chill, or by sensations of unusual faintness, or even by milder symptoms. Not often has a history been obtained of long preceding languor and depression. The chill, when such is experienced, is followed by a rise in temperature and the records of many of these patients show that 105 degrees F. are often reached. Nausea, either with vomiting or amounting to merely a distressed feeling in the region of the stomach, may be present or be not perceived. Pain in the back (lumbar ache) is relatively frequent. With these symptoms may be experienced headache, dizziness, and faintness. Dr. William M. Welch (*Phila. Med. Journ.*, Nov. 18, 1899), has presented an admirable picture of the symptoms noted in the prevalent epidemic, and he adds that in children there is apt to be a tendency to stupor and that convulsions often occur. In from two to three days there follows either a complete disappearance of all the symptoms of fever, or a very pronounced reduction of the temperature. In a few cases this practically closes the career of the disease. In the most, however, an eruption promptly appears, first, as a rule, on the exposed portions or the skin, such as the face, including the temples, and the scalp and the neck and hands, which, with greater or less rapidity, at



No. 8.—Illinois Epidemic. Cut kindly loaned by Illinois State Board of Health.

the most in two or three days, becomes distinctly generalized, that is, it spreads over the general surface, involving the head, trunk and limbs, including the mouth, the palms of the hands, and the soles of the feet. This eruption, usually completely developed in twelve hours, is declared by the production of minute, distinct, isolated, and firm elevations of the surface (papules), which, when compressed between the thumb and finger, produce the impression to the touch of small-sized shot imbedded within the skin. Between the second and third days, on the summit of these shot-like elevations, develop "watery heads" (vesicles), having imprisoned within each a clear fluid (serum, sero-pus), which becomes opaque or cloudy in the course of the third or fourth day. In some of these isolated elevations (papulo-vesicles) there may be evident a distinct puckering or infolding of the top of the head (umbilication). In many cases, however, this symptom is either wholly wanting or but faintly declared at a few points to be discovered only after careful search of the entire field affected with the rash.

The watery stage of these elevated semi-solid points is more or less rapidly exchanged for that where pus is formed in each, and the resulting pustules in well-marked cases are in the course of the fifth or sixth day rather symmetrically distributed over the surface of the regions already named, the largest and most distended occurring, as a rule, over the exposed parts, such as the face and the hands. At about this time a very distinctly defined narrow reddish blush forms as a margin (halo) about the elevated pock, which persists with greater or less conspicuousness until the crusts which form later are shed. The pustules are large, often as large as small beans; they may seem to "balloon" with matter; they are highly disfiguring.

Thus far in its career the disease corresponds to a degree with the usual course of unmodified smallpox, and in fact can rarely be mistaken for any other malady. It has been shown that even before reaching any one of the stages described, there may be a speedy relief of all symptoms, and the patient may not only not have remained in bed, but may have actually undertaken the usual pursuits of his or her vocation in life. The most significant and startling contrast, however, between modified and unmodified smallpox, is exhibited when the patient, after reaching the stage described, of complete development of pustules, suddenly ceases to betray any further significant symptoms of smallpox. The pustules dry rapidly into crusts, which are thrown off and leave the skin either somewhat stained at the points where the crusts formed, or in nearly its normal condition. Some of the elevated points seem to recede; others with insignificant crusts atop each, when the latter are removed resemble in appearance simple warts from which the head has been torn in the act of scratching. In yet others, semi-solid elevations (papules) of the skin remain, which do not betray the tendency to maturation (suppuration) displayed in other cases.

In the most of instances there is afterward an entire absence of the subsequent manifestations of unmodified smallpox, such as secondary fever, which in the severer forms of the disease is without question of septic origin. The grave consequences of the malady recognized in the nose, the mouth, the lungs, and the viscera, accompanied often by evidences of dangerous implication of the nervous centers, are all wanting. In rare cases, secondary fever has been recognized, but in a mild form.

It is claimed by some physicians that in the prevalent epidemic no scars.

are left at the sites of eruption, a statement which may be accepted as true for certain cases only. In others scarring of the face follows, but to a less severe degree than in uncomplicated smallpox. Certainly in this epidemic the eruptive symptoms are far more superficial than in unmodified smallpox, where the deep set pustules work such havoc to the deep integument (the corium).

It is somewhat remarkable that the most precise and voluminous writers on the subject of smallpox lay but little stress upon a feature which is regarded by some practitioners as absolutely diagnostic, viz., the odor. Some authors, among whom Moore may be cited as an example, barely refer to such a symptom. Others, such as Graham, who had a large experience of the disease both in this country and abroad, limit themselves to a mention of the intolerable stench emitted, naturally enough, by patients in the pustular stage of severe confluent smallpox. Whether or not specially characteristic, the odor in these instances is both persistent and disgusting. That, however, cases of true variola occur where the average physician is wholly incapable of recognizing any peculiar odor is absolutely certain; and the absence of such a perceptible symptom is to be expected rather in the modified than in the unmodified types of the malady. In the final stages of mycosis fungoides, pemphigus malignus, and even in gunshot wounds of the chest followed by pulmonary gangrene, the fetor may be even more offensive than at the close of the career of unmodified smallpox.

The portraits presented by Dr. Welch of the form of mitigated smallpox which has been epidemic in several counties of Pennsylvania, furnish ample proof that the symptoms are those seen by our Illinois observers. The disease is one, and its manifestations are the same. In order to show that smallpox with precisely the same mild symptoms, and exactly similar type is prevalent outside of Illinois, Kentucky, Tennessee, and Pennsylvania, it is only necessary to read the reports made by physicians in these other districts. By way of illustration, I append the following extract from one of a series of letters sent me by correspondents in Kansas. The author of the following paragraphs is a physician of large experience and intelligence, filling a responsible office in his community. He not only gives a suggestive sketch of the epidemic as it has happened among his people, but also describes somewhat in detail the case of his own child watched by him with the anxiety of a father and with the care of a skillful practitioner. His letter describes a case of modified smallpox of the precise type now prevalent in Illinois and other states of the Union :

"My boy, nine years old, just recovering, has the following clinical history: Thursday noon, October 19, he came home complaining of headache and dizziness, and did not want to go back to school after dinner. We kept him at home and he lay on the sofa most of the afternoon, but went out doors for about an hour. He had some fever, but was so slightly ill that I did not use the thermometer. Friday morning he rose and dressed and felt better, but about 11 o'clock had a chill, which was followed by fever, temperature 103°. I thought he was coming down with malarial fever, and so gave him quinine. The next morning his temperature was about 102°, but he felt pretty fair until towards noon, when he complained that his feet were cold. His temperature at about 9 p. m. was 105 1-5°. We began bathing him with water of a temperature about 85°, with a little alcohol added, and by 10:30 p. m. he had a temperature of about 103°. He then went to sleep, resting quietly, calling for a drink two or three times during the night. On Friday he vomited several times, and I think once on Saturday. He did not complain of headache or backache except on Thursday. Sunday morning I discovered about half a dozen red macules on his face (left temple and cheek and right cheek), also several on his forearm and on his back. By night there were thirty or forty spots over his face, arms,



No. 9.—Illinois Epidemic. Cut kindly loaned by Illinois State Board of Health.

"*impetigo contagiosa*." County fairs were held, theatrical amusements attended, and public schools opened, with victims of the disease freely communicating with the unaffected. The vaccinated were mostly exempt, but a few of the protected suffered. The preliminary fever was slight, the eruption superficial and the eruptive period brief and irregular of career; secondary fever was rare, and pitting was exceptional. A few malignant purpuric and hemorrhagic cases were observed, some of these swelling the list of fatal attacks.

The patients affected with this type of mitigated smallpox in Missouri (more particularly in St. Louis) were affected in precisely the same manner as those observed elsewhere. The first cases seen were described as



No. 11.—Case of modified smallpox, Illinois epidemic. Diagnosed as "Puerto Rican chickenpox."

"chickenpox," but later the physicians in attendance freely acknowledged their error.

The objections raised against considering these and yet milder types of the prevalent disease as smallpox in a modified form cannot be supported by fact or well-founded argument. They may, however, be briefly noticed.

First, the objection is urged that the watery heads (vesicles) seen in the affected patients are not puckered (umbilicated) as in the types of smallpox described in the text-books. To this it is responded that in every epidemic the puckering, or, better, fluting, of the apex of the fluid-containing eleva-



No. 10.--Illinois Epidemic. Cut kindly loaned by Illinois State Board of Health.

tions of the skin may be wholly or in part wanting. At times the entire body-surface is practically covered with these small elevations of the outer skin filled with a cloudy fluid, each as distinctly puckered (crenated) as if the center of the roof were tied down by a centrally inserted thread. At other times one searches in vain for this interesting feature, of which it may be remarked in passing that it is not, as has been generally taught, seen only in smallpox. Other pustular diseases exhibit the same feature at times, though few to the same extent as variola. This symptom has been



No. 12.—Epidemic of modified smallpox, Illinois patient. "Puerto Rican chickenpox."

fairly well marked in a few patients seen by me in the present epidemic. Dr. Welch has had a similar experience. In the most cases, however, it has not been recognized.

A second objection is based not merely on the universal mildness of the symptoms in patients of the class described above, but on an almost entire absence of symptoms in the case of men and women who have been discovered on the streets pursuing their usual vocation. There is nothing novel and extraordinary in these histories. They are, however, sufficiently familiar to physicians who have had a large experience with smallpox. The lassitude and discomfort experienced by some sufferers is either ignored or absent in others, particularly in those of a vigorous constitution and of adult years. The eruptive symptoms in these cases may be limited to a few and even to two "pocks" on the body surface. The verdict of smallpox which has been properly made in such instances has often excited the derision of uninformed persons. But the published and unrecorded experience of groups of these phenomena is too well established to be ignored. Smallpox, indeed, may occur without producing any eruption whatever (*variola sine variolis*), the verification of this fact being best made in the pregnant woman who, after a chill and fever without any skin-symptoms whatever, afterward brings

into the world a new-born child covered with pustules of the confluent disease.

A third objection is presented on the ground of the condition of the patients affected with the disease now epidemic when examined with reference to cow-pox (vaccinia). It is alleged [that in the present epidemic the vaccinated and the unvaccinated suffer alike. This is an important allegation which demands a word or two of explanation.

Vaccination is a method by which protection is secured against smallpox by introducing into the human system another and different disease. This disease, cow-pox, is well known to be different from the malady produced by the intentional production of smallpox in cows, though there is remarkable correspondence between the two, the differences proving that the two diseases, if not identical, are certainly allied. Vaccination is a very remarkable and satisfactory method of securing immunity from smallpox, but it is far from being a perfect method. No ingenuity of man has yet sufficed to create absolute safeguards against the manifold dangers of human life. The strongest iron steamship that can be constructed may be crushed like an egg shell under the blow of one of the largest billows in an Atlantic tempest. In the gravest of smallpox epidemics, for example, in the form known as hemorrhagic variola ("black measles"), the vaccinated and unvaccinated suffer, not, it is true, in the same degree, but both suffer. I have seen a man die of confluent smallpox with two excellent scars from vaccination on the arm. Of the cases seen by me in the towns of the State of Illinois, four out of six of the patients have exhibited no signs of vaccination and have been unable to give any record of having been vaccinated.

Now, it is not true, that on the whole the protected and unprotected suffer alike in the present crises, but even when the disease is mitigated, an epidemic influence will explain the occurrence of smallpox in the vaccinated. It must be remembered that while the symptoms under consideration are extraordinarily mild when compared with the frightful scourge of the unmitigated disease, still the epidemic influence has been extensive and many patients even though not dying have suffered enormously. Some of them have been well-nigh covered with pustules, many have endured high fever. Fortunately, the physicians interested in the study of these cases find them of special interest and worthy of careful attention, but many of the victims of the prevailing epidemic have an aspect which proves in the highest degree loathsome and suggestive of horror to persons unfamiliar with the disease, who probably, if occasion offered, flee affrighted from the presence of the sufferer. So, then, although the symptoms are unquestionably mitigated, still an epidemic actually prevails and one productive of serious, even if not always fatal, mischief. This epidemic influence is a potent factor. It is an influence exerted generally in any community attacked so that the susceptible suffer as they would not if a sporadic case, for example, if smallpox were by accident introduced among them. The French have a proverb which runs: "At night all cats are gray." In an epidemic of smallpox the shades of difference between the protected and unprotected often appear to vanish. It is under these epidemic influences that men and women have several successive attacks of smallpox, one attack not furnishing immunity against another. These cases are rare, but they do occur and are sufficiently suggestive. I have seen a physician in a severe variolous



No. 13.—Epidemic of modified smallpox, Illinois patient.
"Puerto Rican chickenpox."

Even as recently as the current year, Kotowtschikoff* has discovered that in the suppurative stages of smallpox successes may be secured by vaccinating as often as twice in the day, and he has advocated this as a means of favorably influencing the course of the disease. But vaccination during the period of convalescence from smallpox, whether the latter be modified or unmodified, is typically successful only as a matter of very great rarity. The symptoms usually evoked by such attempts at vaccination are either the production of spurious and abortive pocks or what is more common the production of vesicles and pustules wholly unconnected with the vaccinal process.** It



No. 14. Child dead of smallpox on seventh day of eruption. Age 32 days. Illinois epidemic.
"Puerto Rican chickenpox"

is an established fact that after the occurrence of smallpox the skin is left in a very sensitive morbid state. It is the frequent seat of pustules, abscesses, carbuncles, and other pus-containing symptoms of the surface, and these are specially apt to be provoked where the needle of the vaccinator has been employed.

Turning now to the diagnosis erroneously made of the disease under discussion, many of its victims have been reported to suffer from chickenpox (varicella). An error here can scarcely be made by a conscientious and careful observer. Let it be thoroughly understood at the onset that a patient affected with modified smallpox may have milder symptoms than another suffering from chickenpox. The difference between these wholly distinct affections are not exclusively those of severity. We have seen tha

* Journ. of Amer. Med. Ass'n, Dec. 23, 1899.

** "Smallpox undoubtedly exhausts the susceptibility to the vaccine disease. There is however considerable virus in use at the present time which is sure to cause a sore arm even in immune persons. In testing the immunity of individuals who are thought to have had smallpox, it is important in performing vaccination for this purpose, to be sure that the disease which follows is genuine vaccinia."—WILLIAM M. WELCH, to the Illinois State Board of Health.



**No. 17. —Variola confluens, in pustular stage. Notice constriction made by ring on little finger of left hand. Photograph taken at Mt Pleasant, May 14, 1900, by Dr. O. J. Porter.
Kindly loaned by Tennessee State Board of Health.**



a man with modified smallpox may exhibit perhaps but two pocks on his body, and even may be able to attend to his regular duties. While chickenpox is universally and justly recognized as a very much milder disease than smallpox, a child affected with a severe form of varicella may really be very uncomfortable for two days with the body extensively covered with the special symptoms of that disease. A man with a lion's cub for a pet would not dream of rating it below a fully grown German boar-hound because the cub was the smaller of the two beasts. He would know that in time the lion will be able to slay the dog with a single blow of its powerful paw. This is quite suggestive of the difference between what might be called figuratively "baby-small-pox" and chickenpox. The former may extend and develop until it is competent to destroy human life at the rate of the most fearful scourges of the human race. But no degree of development or extension can ever convert chickenpox into anything more than a trivial affection.

Chickenpox* (varicella) is ushered in, as a rule, by no pains in the loins, nor by nausea, vomiting, nor by a high range of bodily temperature for two or three days preceding the rash. At the most, there are but a few hours of mild fever in which the thermometer practically never rises as high as 105 degrees F., and the eruptive symptoms speedily appear, first as slightly reddened blotches scarcely larger than half a pea, upon the surface, which rapidly become exceedingly superficial "watery heads" (vesicles) without the previous occurrence at the site of each, of elevated, firm, shotlike masses in the skin underlying each point. A feature of distinguishing importance in this malady is the rapid occurrence of the eruption over the protected rather than as in smallpox over the unprotected surface of the body, and in successive crops, the patient at the moment of first examination, for example, exhibiting large numbers of blister-like "watery heads" (vesicles) over the back or on the chest, with a relatively smaller number on the face. At the height of the process a finger-nail can practically erase most of the evidence of trouble at any affected point. The velvety elevations are never puckered on the roof-wall of the single chamber containing the clear or opalescent fluid (serum); the crusts which form subsequently are thin and friable; the vesicles never develop into unmistakable pustules; at the worst, in from two to four days, the eruption and the disease are practically at an end. From first to last there is no suggestion of the career of even the most modified smallpox in the symptoms here enumerated. The mild fever persists during the eruptive stage, and at the outset of such a stage does not vanish or diminish, as in smallpox. Second attacks are rare; one attack confers no immunity from smallpox. Here the vaccinated and unvaccinated suffer alike. Hence it follows that any patient exhibiting vesicles surmounting firm elevations of the surface of the skin, developing first on the exposed surfaces of the body, appearing on the third day after a high fever, with lumbar pain and nausea, and coinciding with marked fall of the febrile temperature, is almost certainly smitten with smallpox and not with chickenpox.

One might almost wish that the late Tilbury Fox had never introduced his "impetigo contagiosa" to the notice of the profession, seeing that in connection with smallpox more sins of diagnosis may be laid to its door

* * * Varicella is essentially a disease of early life, occurring almost exclusively in infants and young children.—JAMES NEVINS HYDE, in Pepper's System of Medicine.

than in the case of any other disease in the nomenclature. A few considerations, however, suffice to stamp its individuality. The "watery heads" (vesicles) which appear with relative suddenness in this disorder, and which are not only superficial but which enlarge by lateral rather than by deep extension, are absolutely the result of infection with pus-organisms at every point where the symptoms develop. With this simple fact in view all errors of diagnosis may be avoided. Impetigo contagiosa is, for the most part what may be termed a "finger-nail filth" disease of early life, chiefly of children or of young adults. The finger-nails, charged with the effective



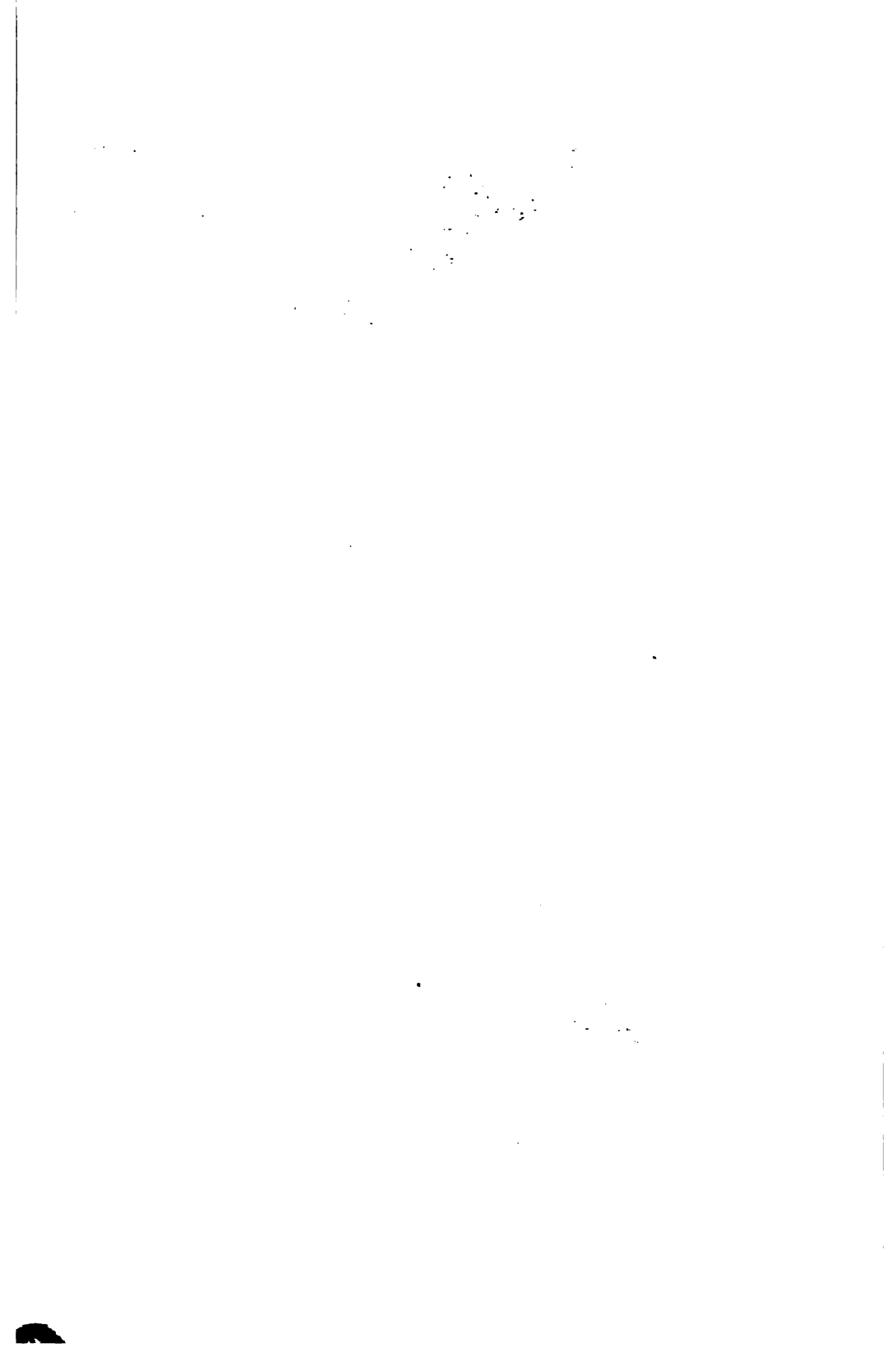
No. 15.—Epidemic of mitigated smallpox, Kansas patient.

elements of the disease, convey these sparsely, not plentifully, to accessible portions of the body, the face (lips, nose, ears, cheeks), the hands, the knees, etc. The later "stuck-on," friable, readily removed, superficially attached crusts, never implanted on a firm base, are justly regarded as characteristic. In our clinical experience it is rare that more than a score of these individual symptoms may be counted in any single person. Our English brethren report cases in which the disease is widely generalized; I have rarely, very rarely, so seen it. When fever co-exists, as reported, it is unquestionably the result of the irritation produced in the skin by the purulent germs. No patient displaying numerous pustules symmetrically developed and seated on a firm base, after the subsidence of high fever, is suffering from any form of impetigo.

The distinction between a patient suffering from a generalized eruption of the pustules of syphilis and another exhibiting the pustules of smallpox, is chiefly interesting as an academic study, inasmuch as not rarely, in the great St. Louis Hospital of Paris, and occasionally at my own clinic, patients are found standing in the line of applicants for relief, one showing smallpox pustules, and another next or near exhibiting the pustular symp-



No. 18.—Showing a frequent type of mild eruption passing from the umbilicated vesicle to the pustular stage. From a cast made by Dr. Otey J. Porter, of Columbia, Tenn. Kindly loaned by Tennessee State Board of Health.



toms of syphilis. Both, it may be observed, may have a slight rise in temperature.

But it is to be remembered that the generalized pustular rash of syphilis is really rare in America, seeing that the eruption finds amplest expression only in the persons of the extremely filthy, the victims of debauchery, drink, and poverty. It is almost never recognized among the well-to-do, the cleanly, the comfortably housed, and the warmly clad; however often these latter may suffer from other symptoms of the disease. Of course, in any doubtful case, the history of syphilitic infection and the presence of other manifestations of the malady (mucous patches, alopecia, enlarged glands, traces of initial chancre) point to the truth. In syphilis the much slower evolution of the symptoms (time is a valuable aid to the physician in the diagnosis of smallpox), the obvious tendency of the pustules to cluster about the sides of the nose, about the cleft of the anus, about the ears, and



No. 16. Epidemic of mitigated smallpox, Kansas patient.

near the line of the hairs at the brow, the peculiarly dirty-looking crusts which form at the apex of the semi-solid elevations of the surface, the failure of such distinct isolation of the individual pustules as occurs in all but confluent variola, are important diagnostic features. The patient with pustules of smallpox generally distributed over his body is usually found in bed. The syphilitic subject commonly makes shift to present himself at the out-patient department of a dispensary or hospital; in other words, the one readily, the other only with difficulty, tolerates his disease.

In view of thoroughly characteristics features of even modified variola, it is almost superfluous to consider in detail the differences between its symptoms and those of eczema, acne, herpes, pemphigus, and the medicinal rashes. None of these is suddenly displayed after three days of fever and a rapid decline of temperature, in symmetrical development, attacking first the exposed surfaces of the body. The simple forms of herpes are generally seen clustered about the orifices of the body; the "shingles" variety (herpes zoster) is well-nigh invariably unilateral in disposition. Acne in pustular

development affects the face, it is true, but is wholly unaccompanied by fever, and in its manifestations far outlasts all the symptoms of smallpox. The doubtful physician here, as so often when attempting to distinguish between similar affections, is aided by the passage of time. Pemphigus, in its manifold expressions, is not only a disorder, the skin-symptoms of which outlast, as a rule, the brief career of the eruptive features of smallpox, but it is one in which the blister-like elevations of the surface (blebs, bullæ) are, as a rule, larger, and are filled with a fluid undergoing less rapidly than in smallpox the change to pure pus. With respect to the medicinal rashes, some of which, without question, are liable to be mistaken for the symptoms of smallpox, it is to be remembered that the withdrawal of the offending medicament is always followed by immediate amelioration of the symptoms in the skin. As in the other cases, the absence of fever and of a history of fever is to be considered in connection with the fact that very rarely indeed, if ever, do these rashes undergo changes consecutively from one type of eruption to another, firm elevations of the skin-surface, for example, changing to those exhibiting "watery heads" (vesicles) at the apex of the elevation; and these latter in turn changing to well-developed pustules. For the most part, the medicinal rashes develop in a single type, blushes, pustules, etc., appearing as such with promptness and not changing until the withdrawal of the efficient cause of the malady.

The severe and generally intolerable itching that distinguishes eczema need never be confounded with the excessive burning pain experienced by patients with a smallpox eruption over the face. A simple diagnostic difference will here suffice for the inexpert. There is almost never scratching of the affected part in smallpox, but that is a rare form of eczema in which at one time, or another there is not only scratching, but also unmistakable evidence of scratching in the torn and abraded integument.

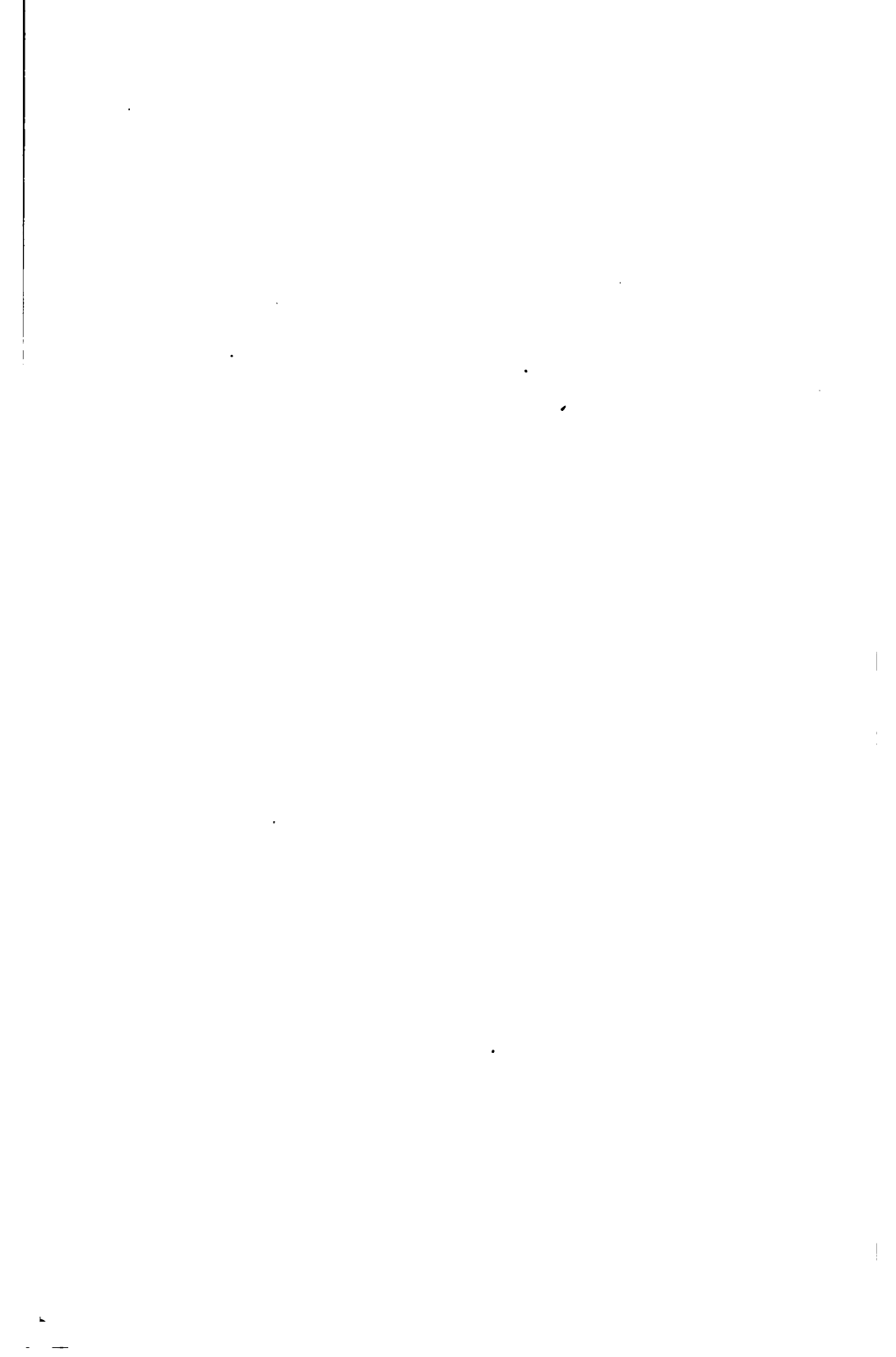
Returning to the prevalent epidemic of smallpox, it remains to explain, if possible, the mildness of the symptoms not in any one given case, but in such an extended series of cases, a mildness which has given rise to so much perplexity. I can think of no better illustration of this interesting fact than is furnished by another, even if vastly simpler, cutaneous affections, namely the mosquito-bite.

Even the uneducated people of our country are thoroughly familiar with the results of an extensive attack upon the skin by the mosquitoes of densely populated and well cultivated regions of the United States. The mild results produced are, without any contention, due to the fact that for the most part the individuals attacked are the children of generations of men and women bitten by mosquitoes on this soil, who have transmitted their relative but not perfect immunity to their children.

Far different is it with those who come to our soil from countries where the mosquito has never feasted on the blood of their ancestors. Early in the Revolutionary War, and during their first summer in this country, the mercenary troops coming from Hesse-Darmstadt and Hesse-Cassel were so seriously attacked by mosquitoes on their march from Trenton, in New Jersey, that hundreds of the men were unable to distinguish objects through their swollen eyeslids and were rendered wholly unfit for duty. Precisely the same symptoms are now recognized in mid-summer, especially in the City of New York, where the newly arrived immigrants from portions of



No. 19. — Face from case of confluent variola at Mt. Pleasant pest house, taken three hours after death. Cast made by Dr. O. J. Porter.
Kindly loaned by Tennessee State Board of Health.



Great Britain in which there are no mosquitoes, are exposed for the first time to the incursions of the marauders. The results are often astounding to those unacquainted with the secret of their origin. The exposed faces are often enormously swollen and look to be affected with an erysipelatous process. Large blisters (blebs) rise from the excoriated surfaces. The limbs and even the trunk, particularly of women and children exposed during the discomforts of sleep in a tropical temperature to which they are wholly unaccustomed, may be affected equally with the face.

So should it be and so increasingly should it be, in the case of epidemics which can be mitigated by the skill of man, such as yellow fever, where we now know uncleanness plays such an essential role, and smallpox, where vaccination has worked such important changes. Science, in the long-run, comes to its own. Generations of our ancestors have been vaccinated and re-vaccinated, and even their unvaccinated children confess the influence of the immunity thus secured.

A modification of the potency of any germ may be produced by cultivation in special soils. We need to go no further than the bacteriological laboratories to find proof of this accepted fact. Fraenkel has demonstrated that an enduring decrease, even "a complete and irrevocable loss of virulence," has been produced by artificial cultivation of most of the different species of pathogenic bacteria, and among these may be cited as conspicuous examples the germs of swine-erysipelas, of symptomatic anthrax, and of pneumonia.

Thus a minute organism descended from a death-dealing source may become in the culture-tubes of the experimenter as harmless as those found in an ordinary infusion of hay (*bacillus subtilis*). The mildness of the present smallpox epidemic can be accounted for rationally only on the basis of the very general practice during the last fifty years of vaccination of our people. Instead of being astounded at the result, we should greet it with a degree of satisfaction. It is the fruit of a century of progress. It is the dream of the exponent of state medicine to modify in similar measures the several scourges of the human race.

War is as destructive as pestilence, and the one often sails in the wake of the other. "After the conflict, what disease?" is the query of the scientist. All our wars have left an heritage of some sort in unusual or unusually prevalent maladies. The battles of the Revolution were followed by such an extensive invasion of the itch that the public journals of that day are seen to be filled with advertisements of remedies for its relief. In the aftermath of the late Civil War, among other disorders, followed an unprecedented number of cases of typhoid-malaria. Our armies in Cuba and Puerto Rico have been lately exposed to smallpox at Holguin and other points. If, as seems probable, they have brought back to us the contagion of the present epidemic, it should be noted that the carriers of these germs were not the natives themselves, but our own carefully vaccinated American soldiers. In these facts alone the scientist may find an explanation of the interesting features of the disease here discussed.

The names popularly given to the disease now epidemic in several states of the Union point more or less suggestively to its origin; for the terms

"Spanish measles," "Cuban itch,"* and "Puerto Rico scratches" are frequently heard in the houses of the sufferers. The island of Puerto Rico has, however, set a notable example to the smaller towns of this country in the way of stamping out the epidemic. Although in December of 1898 three thousand cases of smallpox were reported in sixteen of its municipalities, after the establishment of a government vaccine farm about eight hundred thousand natives were successfully vaccinated without rioting or disturbance, at a cost of about four cents for each individual; with the result that in less than one year (according to the report of Surgeon-Major Groff), by October, 1899, no case of smallpox was known to either the civil or military authorities anywhere in the island.

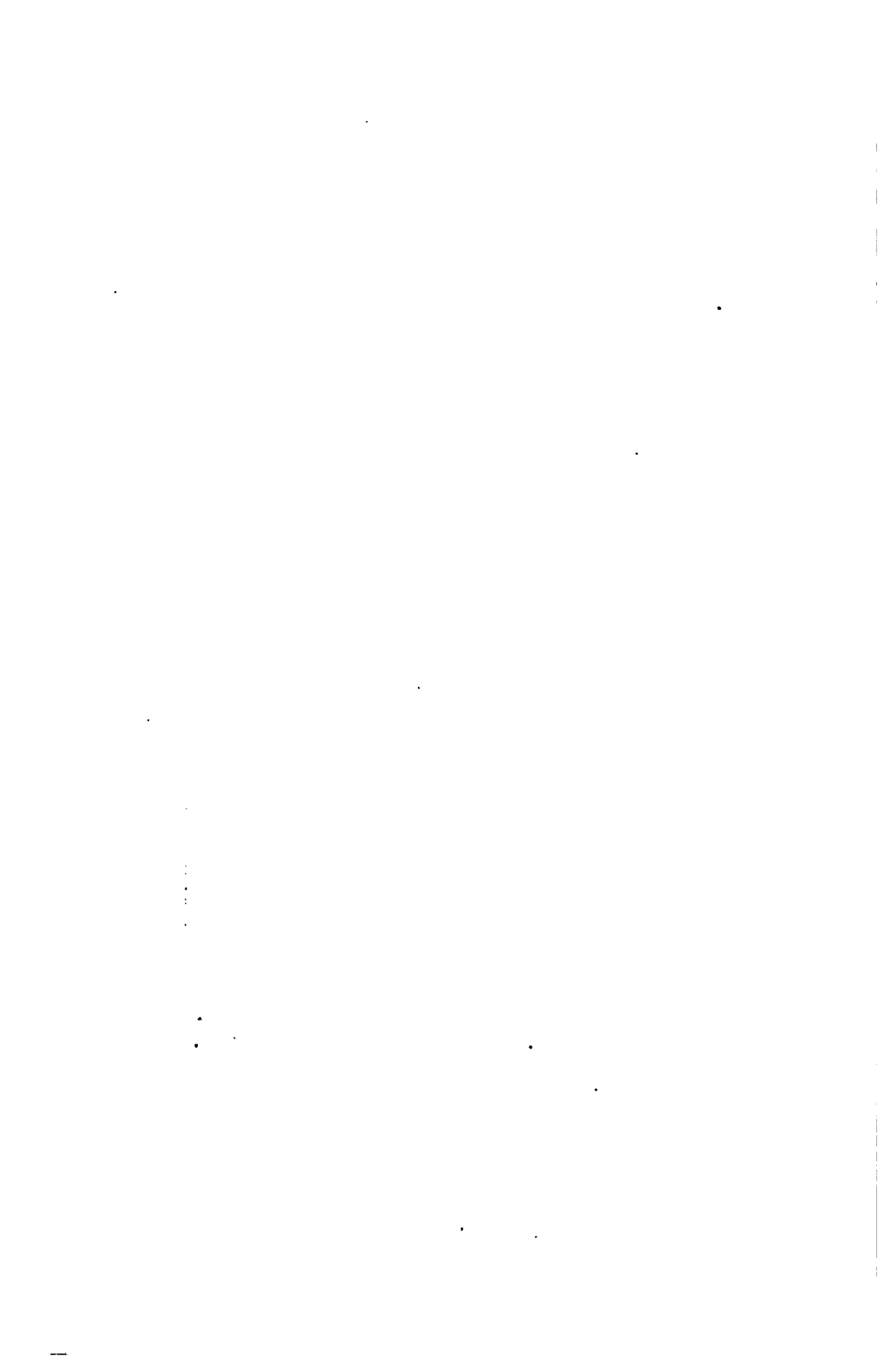
It seems scarcely necessary in this connection to call attention to the fact that even the mildest epidemic of smallpox may, under special circumstances, give rise to the most malignant cases of the disease. It has been already shown that the mitigation of the malady has been largely produced by the universal vaccination and revaccination of generations of the American people. Still it should not be forgotten that all the aggravating factors in the production of an epidemic are not yet wholly revealed to us. It has been supposed that certain climate conditions have exerted some influence in one direction or the other. This, at least, is certain, that the introduction of even a single case of mitigated smallpox in a community which has been unvaccinated, has been again and again the fruitful source of one of the most fearful scourges that has ever afflicted the human family. Who, for example, would dare to introduce one of the victims of the present mild epidemic into such a community as that, for instance, furnished by the unvaccinated natives of Samoa! The consequences would certainly prove more formidable than if they had been subjected to a rain of the explosive missiles which have been forbidden lately by the Peace Conference at The Hague. It follows that only the most skillful and energetic measures should be taken to prevent the spread of the present epidemic, even in its mild form, as no living man can predict what type it may assume on the morrow or the following week.

The conclusions which one is justified in drawing from the facts here set forth are as old as the days of Jenner and as imperative as in the year when the clear-sighted von Hebra wrote his chapters on smallpox so lucidly and emphatically that today they present a true picture, as well of the virus as of its most efficient antidote. Vaccination and revaccination of everybody—child, adult, foreigner, native-born—there is no other safe reliance for the present and the future. By the methods known and found most effective in the care of the public health the epidemic must be stamped out and the disease at last completely eradicated. We may well doubt whether a smallpox epidemic, even of mild character, could prevail in any of the smaller communities in England and Germany, where vaccination is so generally and efficiently enforced. It is said that the modern tourist, if he could be transported to the streets of London in the last century would be immensely astonished, not so much by the dress of the people, by the aspect of the shops, and by the odd looking vehicles on the streets, as by the extraordinary number of pock-marked faces on every hand.

* "I am aware of no disease called Cuban itch which could be mistaken for smallpox. There are several erythematous eruptions in Cuba called Cuban itch, but they are prickly heat or ringworm."—Surgeon General U. S. M. H. S. to Illinois State Board of Health, Dec. 7, 1899.

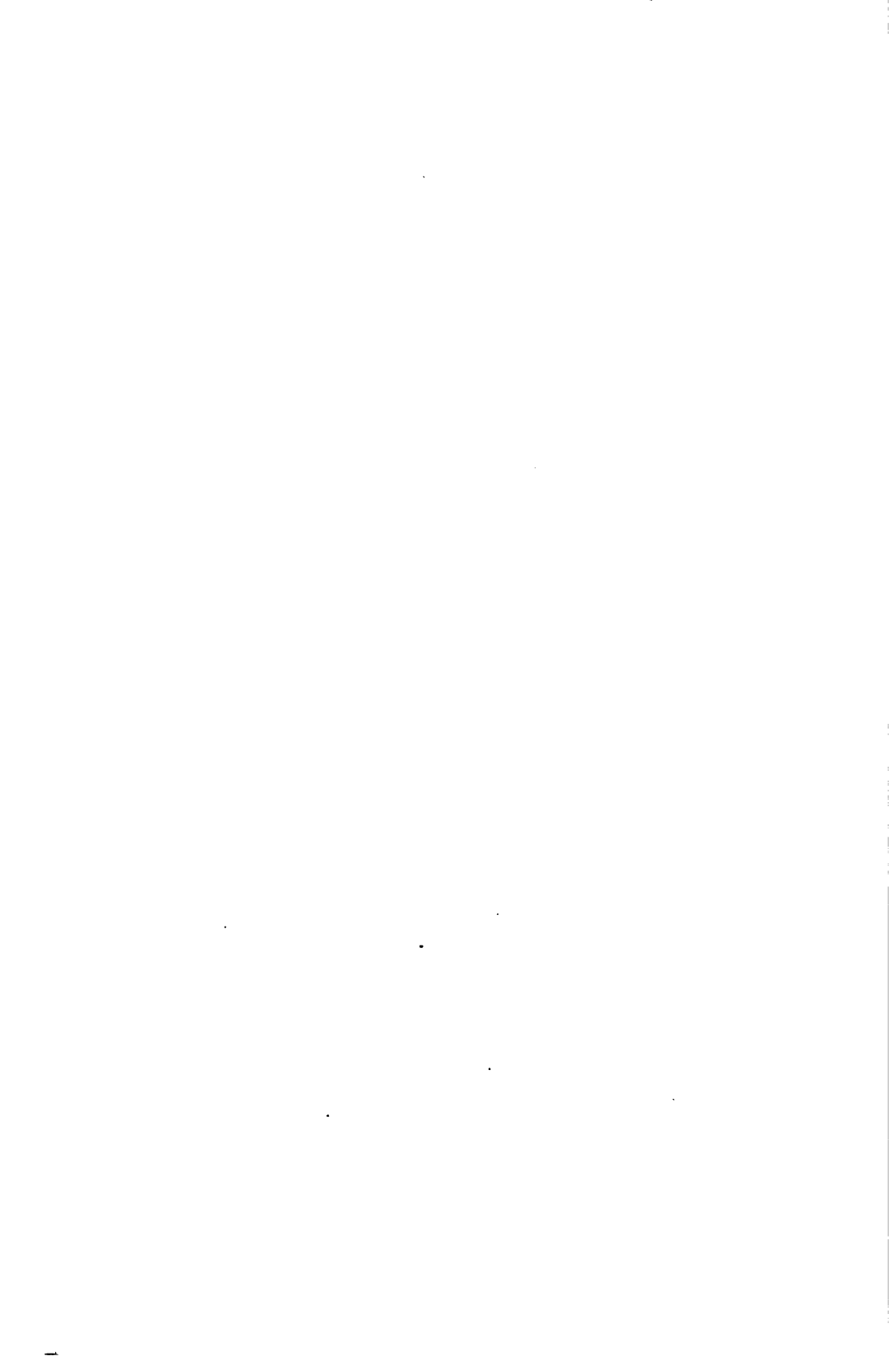


No. 20.—Light discrete case in early pustular stage, from Clarksville, Tenn.
Negative by Dr. Louis Leroy. Kindly loaned by Tennessee State Board
of Health.





No. 21.—Same case as No. 3. Negative by Dr. Louis Leroy. Kindly loaned by Tennessee State Board of Health.



At last the English people have learned their lesson and learned it well. They have had a bitter experience of the devastation which smallpox is capable of working among their kindred, whether in the hovel or in the palace. They have mourned the loss of a gracious sovereign smitten with the pestilence on the very throne of the kingdom. While we may not wish to follow them in all matters, they have set us a worthy example in the methods by which they have buttressed their bulwarks of immunity. The germs of this pestilence are powerless against the army of their humble villagers and peasantry, ranks upon ranks of whom bear on the arms of each no fewer than four and often as many as six and eight scars of effective vaccination. Vaccination should be the sole passport of entrance to the public schools, to the voters' booth, to the box of the juryman, and to every position of duty, privilege, or honor granted either by the State or by the Nation.

XVIII

FORMALDEHYDE DISINFECTION*

Much has been written in the past few years on formaldehyde gas as a disinfectant. Observers and experimentors have all come to the conclusion that it is the most powerful germicide and disinfectant known, but the mode of application for practical working purposes varies with each experimenter, each claiming good or superior results over others, and each working on different lines. Many different kinds of apparatus and methods have been invented for disinfection of houses after contagious diseases, some exceedingly simple, others, most complex machines—nearly requiring an engineer to operate them; all, however, serving more or less to accomplish the desired result, viz., disinfection. With some of these devices disinfection is so incompletely accomplished that all that can be said of them is that they are simply manufactured "for sale."

These reasons, and others, in February, 1898, led the Commissioner of Health of Chicago to request the writer to experiment with formaldehyde gas as a disinfectant, to determine, if possible, a satisfactory method for using it. Some experiments had been performed previous to that time with but partially satisfactory results, in a manner of boiling a diluted solution of formaldehyde, in an open vessel, over a spirit flame†, and then depending on the liberation of the gas for the purpose of disinfection. It was found that this was far from satisfactory. Other methods were tried. Apparatus, in which the liberation of the gas depended on heating the solution in closed reservoirs or passing through hot coils and then passed by means of a tube through the keyhole, was soon discarded, as it was found that the steam condensed in the room and dripped on the floor. Then the diffusion of the gas through hallways and a series of rooms was too slow to permit of practical working purposes.

Platinum gauze generators for the conversion of methyl alcohol into formaldehyde gas were unsatisfactory, as the gauze soon burnt out, giving a variable amount of the gas.

Paraformaldehyde, or polymerized formaldehyde, was heated and sublimed or converted into the gas; but it was found too much paraform sublimed, coming down as a fine white powder, slowly changing to formaldehyde gas, and producing for days a most persistent irritation to the respiratory passages and eyes, and with but slight disinfecting qualities.

At that time the writer, with the assistance of one of the disinfectors, sprayed the walls of a dwelling with the 40 per cent. solution of formalde-

*Text and cuts kindly furnished by the Chicago Health Department.

†January Bulletin, 1898, Chicago Health Department. Formaldehyde Disinfection.

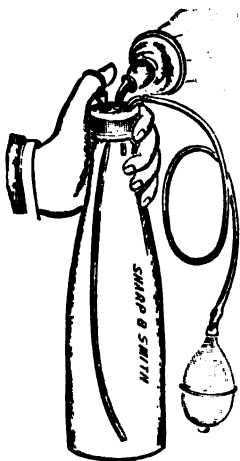


Formaldehyde Disinfection—Chicago Health Department.

hyde. It was found that the liberation of the gas was so rapid as to force a most precipitate retreat.

This suggested the idea that if formaldehyde was sprinkled in the rooms in sufficient quantities it would disinfect them. But it was found that this was impracticable, because if any of the solution came in contact with the varnish or furniture and woodwork of a room, the wood alcohol in the solution would dissolve the varnish and leave a white spot which could not be removed, unless polish was put on again. Then to be sprinkled on carpets and rugs it soaked into them and very slowly evaporated, leaving a very persistent odor of formaldehyde, which sometimes lasted for days, and not at all pleasant for the occupants. This next led the writer to try bed sheets, which were hung on clothes lines stretched across the middle of the rooms, and on these sheets the solution was poured, and allowed to evaporate. For this purpose 150 c. c., or five oz., were used for every 1,000 cubic feet of air space. Still further experiments showed that when the solution was poured on the sheets a part of it remained as paraform. This again led the writer to arrange some device by means of which the solution could be evenly distributed all over the sheet without producing large splashes and leave a minimum of paraform. At first a bottle was used to which an ordinary watering pot rosehead* was attached, and the solution thrown on the suspended sheets, but this was soon modified and changes made until a suitable apparatus was devised for disinfection purposes and a new system of room disinfection was introduced.

The disinfection apparatus consists of a twenty-two-oz. bottle (700 c. c.) closed with a three-holed rubber stopper. Through one opening projects a



Apparatus devised by the Author and made by Sharp & Smith, 92 Washburn Ave., Chicago.

straight vulcanized rubber tube surmounted by a rosehead sprinkler containing eight 1 m. m. perforations; to the other end is attached a rubber tube reaching to the bottom of the bottle. In the second opening of the stopper is another tube connected with a rubber bulb by means of a piece of rubber tubing. This is for the purpose of compressing the air in the bottle to force the fluid from the sprinkler top. The third opening is guarded by a metallic plug having a ring attached to it and under the guidance of the thumb to release the air pressure when sufficient formaldehyde has been sprayed on the sheets.

With this apparatus experiments have been conducted during the last two years and a half for the purpose of determining the efficiency of this method, with most excellent results, which will be noted after the method of disinfection and the details of preparation of infected rooms have been given.

[[METHOD OF OPERATION

When a house is to be disinfected all crevices around windows, doors, transoms, and all openings into the rooms should at first be thoroughly sealed up with strips of gummed paper about two

*March Bulletin, 1898, Chicago Health Department. Formaldehyde Disinfection.

inches wide and two feet long, to make the rooms as air-tight as possible. The surfaces under these strips should first be wiped with a cloth dampened in bichloride solution 1-1000 for the purpose of removing all germs which would be sealed under the strips covering the crevices. The stoves, fireplaces and flues should also be closed, or when it can be done several thicknesses of newspaper placed over the opening next to the stove and the stove-pipe set on that. The draught caused by chimneys would soon weaken the quantity of the gas in a room, and just that much reduce the proper quantity necessary for the disinfection.

The beds should then be torn apart, the pillows hung over the backs of chairs or on lines, blankets and quilts hung over chairs as loosely as possible, bureau drawers are to be opened and the contents scattered and loosened; folded clothing must be unrolled. Books which came in contact with, or were used by the patient must be set on end and the pages spread to their greatest extent. Rugs, which through neglect, were permitted to remain in the sick room, must be lifted up on chair backs to allow the gas to come in contact with every part of them. Open clothes closets and separate the clothes. Clothing which the patient wore during his or her sickness must be thoroughly looked after, and should be hung on lines stretched across the rooms. This also applies to all soiled clothes, handkerchiefs, etc.

The patient should be given an antiseptic bath and fresh clothes put on before being allowed to mingle with other people. This is especially of importance after smallpox and scarlet fever (and it might be said of any infectious disease), as no matter how thorough would be the disinfection, if this bath and fresh clothing be omitted the rooms are liable to again be reinfected and the disinfection would be worse than useless.

After everything has been hung out and scattered about, a clothes line is stretched across the middle of the rooms, and on this line bedsheets are suspended, fastened by their edges with safety pins. They should not be doubled over the line. The sheets must hang high enough to clear the floor, and under them newspapers should be spread to catch any drops of formaldehyde which might spatter in the sprinkling process.

The sheets can be multiplied to any number, but one must be used for every 1,000 cu. ft. to be disinfected. Everything then being in readiness for applying the formaldehyde solution, the operator takes the sprinkling apparatus in the left hand and the bulb in the right and, compressing it, forces the solution in very fine streams on the sheets. The operator should stand about three feet from the sheets to be sprayed. Here again care must be taken to spread the solution over the sheets as evenly as possible, but not to saturation, going over each sheet but once. One sheet will carry about six ounces, but more should not be applied to any one sheet. Experimental research has shown that the minimum required is at least 180 c. c., or 6 oz. for every 1,000 cu. ft. of air space in the rooms to be disinfected.

A damp towel folded to several thicknesses and tied over the nose will permit the person using the apparatus to remain a little longer near the sprayed sheets. Always commence spraying the farthest sheet, working out, and after all have been sprayed the rooms should be left and the door of exit sealed at once. Thus prepared, the rooms should be left closed at

least eight hours where the conditions of the premises are good, but where poor conditions prevail a longer time may be required, according to the judgment of the disinfecter. If large halls or school rooms are to be disinfected, several bottles should be filled beforehand to facilitate the work.

After the termination of the disinfection the door is again opened and some of the gas allowed to escape before entrance is made into the rooms. Then one window after another is to be opened and the sheets taken down. If care has been taken in the sprinkling and none of the solution dropped on the floor or carpets, the rooms can be occupied from one-half to one hour after opening.

Should there be any odor of formaldehyde gas after one hour, a little ammonia water and oil of peppermint sprinkled around the rooms will soon dispel all traces of the irritating gas.

CONDITIONS TO BE OBSERVED IN DISINFECTION

When the temperature is low or near the freezing point, the full 40 per cent solution should be used; this also holds true till the temperature of the rooms reaches 78-80 degrees F. When above that disinfection will be much facilitated if the solution is diluted, and in excessively hot weather and rooms the solution can even be diluted one-half or more and then sprayed depending greatly on the evaporation in the rooms. It is this added water producing a "Moister gas", which will very markedly add to the value of disinfection. But the minimum of the actual 40 per cent solution must then still be 6 ounces for every 1,000 cubic feet.

Experiments were conducted at various places and under the most trying circumstances, as well as under favorable conditions of disinfection and premises. Sometimes basements of the dampest kind were disinfected and tests placed in these showed most gratifying results after disinfection. At first small cans of blood serum inoculated with various germs were used, being exposed in the rooms, some high, some low, open or covered with three or four thicknesses of bed sheeting, but it was always found that the growth was destroyed. The germs used were *B. of Klebs-Loeffler*, typhoid bacillus, *Staph. Pyog. Aur.*, *Coli Com.*, and anthrax. These cans have now been discontinued, as they have demonstrated to satisfaction the value of the gas as a surface disinfectant.

Inclined agar tubes were next used, inoculated and exposed in the rooms to be disinfected. Some were opened and some left with the cotton plugs in the top. Into those left open the gas penetrated to varying depths according to the germs used. Into the tubes left closed the penetration was not so deep, but still with very good results. The control tubes—also the cans—showed a most abundant and luxurious growth in every case, as fresh cultures were always used, insuring a good growth.

EXPERIMENTS WITH DRY GERMS

"One hundred swabs, which were used for collecting the throat secretions in cases of suspected diphtheria, were obtained from the laboratory after bacterial examination, showing 20 per cent of verified diphtheria and the remainder showing mixed infections of staphylococci, streptococci, the *B. lanceolatus* and *B. prodigiosus*. These swabs, in their original rubber-capped glass tubes, were taken to houses to be disinfected and there exposed

in their dry state to the action of the formaldehyde in the usual domestic disinfection.

They were returned to the laboratory in sterilized tubes, placed in bouillon and incubated from forty eight to seventy-two hours, with the following results: In eleven of the tubes the bouillon showed some turbidity; in the remaining eighty-nine the bouillon remained clear. Microscopic examination of the cloudy bouillon showed chiefly the yeast germ, three staphylococci, eight *B. prodigiosus*; but no diphtheria bacilli were found." (Chicago Health Department Bulletin, May, 1899.)

Cover glass preparations of bacteria, dried, were used in over two hundred experiments. These consisted of *B. Diph.*, Typhoid, *Coli Com.*, *Staph. Pyog. Aur.* and *alb.* and the Class Bacteria of *Scarlatina*.

The slides were prepared from fresh cultures of these bacteria in the same manner as for microscopical examination. They were sent with the disinfectors and placed in various positions in the houses to be disinfected, then returned to the laboratory in sealed boxes, the smear taken up with distilled sterilized water and inoculations made on similar media from which they were taken. The results were that almost without exception no growth resulted, whereas in every instance control slides gave immediate and abundant growth. At times these slides were freely exposed; at other times wrapped in double thicknesses of sterilized woolen blankets, with the same results.

DATE.	ADDRESS.	DIS- INFECTOR.	METHOD.	CU. FT.	C. C.	GERMS.	RESULTS.	Remarks †
Mar.						Cans	Open	Condition.
1	19 Miller	Behm	Gehrman } Generator	3976	720	<i>B. Diph.</i>	O	Poor
2	416 Wolfram	Helmuth	Sheets	2160	400	<i>B. Diph.</i>	O	Poor
4	Oak and State	Helmuth	Generator	1584	300	<i>B. Diph.</i>	O	Good
5	22 Gladys street	Grady	Generator	3672	400	<i>B. Diph.</i>	O	
7	260 Bowen Ave.	Carr } Behm }	Generator	6720	1200	<i>B. Diph.</i>	O	Good
8	556 W. 14th st.	Grady	Generator	4836	700	<i>B. Diph.</i>	O	
11	487 Southport	Helmuth	Sheets	2200	360	<i>B. Diph.</i>	O	Fair
13	1747 Carroll	Grady	Generator	12540	2500	<i>B. Diph.</i>	O	Fair
18	39 Pearson	Behm	Sheets	7400	1400	<i>B. Diph.</i>	O	Fair
19	100 Randolph	Behm	Sheets	100	50	<i>B. Prodig</i>	*	Very poor
21	1049 Winthrop	Gray } Behm }	Generator	3820	540	<i>B. Diph.</i>	O	Good
21	35 Norton	Daly } Behm }	Sheets	960	180	<i>B. Diph.</i>	O	Fair
21	686 Jackson	Grady	Sheets	4680	800	<i>B. Diph.</i>	O	
22	71 University	Behm	Sheets	1960	200	<i>B. Diph.</i>	O	Good
23	445 Elm		Mulford's } Generator	3200	540	Noted	by	Gehrman*
24	445 Elm		Mulford's } Generator	2560	480	<i>B. Diph.</i>	by	Gehrman*
24	529 W. 12 st.	Daly } Behm }	Sheets	900	180	<i>B. Diph.</i>	O	Good
25	234 Wells	Helmuth	Sheets	1850	375	<i>B. Diph.</i>	O	Good
26	1356 Washington	Grady	Sheets	1440	300	<i>B. Diph.</i>	O	Good
29	119 Willow	Helmuth	Sheets	4350	500	<i>B. Diph.</i>	*	Fair, slight growth after 72 hours.

† Results and charts the same as turned in for monthly reports.

* Most all germs green.

N. B. Controls grow in every case.



Formaldehyde Disinfection—Chicago Health Department.

DATE	ADDRESS.	DIS- INFECTOR.	MEDIA	CULTURES.	RESULTS.	TRANSFERS.	CONTROLS	CONDITION OF ROOMS.
July 25	361 W. 64th	Carr	Tube	Diph. Coil Com. Typhoid	Penetration to 2 in. from bot. " " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Fair
25	1079 S. Albany	Flood	Tube	Typhoid	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Very bad
25	523 Taylor	Daly	Tube	1 Diph. 2 Typhoid	" " " " " " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	
			Tube	1 Typhoid	" " " "	A. O. B. †	†	
26	93 Johnson	Gossert	Tube	2 Typhoid	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Bad
			Tube	Diph.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Bad
26	2934 Canal	Carr	Tube	Typhoid	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	
			Tube	Coil Com.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Fair
			Tube	1 Coil Com.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	
26	2189 W 12th	Flood	Tube	2 Coil Com.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Good
26	204 Johnson	Daly	Tube	3 Coil Com.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	Fair
			Tube	4 Coil Com.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	
			Tube	Diph.	" " " "	A. O. B. † A. C. B. † A. O. B. †	† † † † † † †	



Formaldehyde Disinfection—Chicago Health Department.

- (1) 7000 cu. ft. 1200 c. c. Closed 11 A. M. Opened 4 P. M.
Tubes 6 in. x $\frac{3}{4}$ in.

Diph. Open Penetration to 2 in. from bottom
Typhoid Open Penetration to 2 in. from bottom
Coli Com. Open Penetration to $2\frac{1}{2}$ in. from bot.

Three cans of blood serum; same germs, results: No growth.

Controls all grew.

Temperature 46° Wind N. E., 18 M.

Humidity 75 per cent. Sunshine 80 per cent.

- (2) 4000 cu. ft. 600 c. c. Closed 11 A. M. Opened 4:30 P. M.
Tubes 6 in. x $\frac{3}{4}$ in.

Diph. (1) Open high, penetration $2\frac{1}{2}$ in. from bottom.
Diph. (2) Open low, penetration to 2 in. from bottom.
Staph. Pyog. Aur. high Result O high $2\frac{3}{4}$ in. from bottom.
low Result O* low 2 in. from bottom.
Diph. (3) closed on table Penetration to $2\frac{1}{2}$ in. from bottom.

Three cans of same germs on blood serum; result no growth.

Controls all grew.

Temperature 46 degrees. Wind, N. E., 18 M.

Humidity, 75 per cent. Sunshine 80 per cent.

- (3) 1400 cu. ft. 200 c. c. Closed 11:30 A. M. Opened 5:30 P. M.
Tubes 6 x $\frac{3}{4}$ in.

1 Diph. (a) Open penetration to $1\frac{1}{2}$ in. from bottom.
" (b) Closed " " $2\frac{3}{4}$ " " "
2 Typhoid (a) Open " " 2 " " "
3 Coli Com. (a) Open " " $2\frac{1}{2}$ " " "
" (b) Closed " " $2\frac{3}{4}$ " " "
" (b) Closed " " $3\frac{1}{2}$ " " "
4 Staph. Pyog. Aur. Open " " $2\frac{1}{2}$ " " "

Temperature 70 degrees. Wind, S. Rain, Trace.

Humidity 86 per cent. Sunshine 20 per cent.

- (4) 7,500 cubic feet. 1,125 c. c. Closed 11:30 A. M. Opened 5:30 P. M.
Eight cans of blood serum inoculated with B. Diph., Typhoid, Coli Com. and Staph. Pyog. Aur.

Covered with 3-4 thicknesses of bed sheets and pillow cases.

Result: No growth after incubation of 48 hours.

Inclined agar tubes with streak cultures.

Diph. (1) high; Penetration to 1 in. from bottom.
" (2) low; " " 1 " " "
Typhoid (1) high; " " $1\frac{1}{2}$ in. from bottom.
" (2) low; " " $1\frac{1}{2}$ " " "
Coli Com. (1) high; " " $2\frac{3}{4}$ " " "
" (2) low; " " $2\frac{3}{4}$ " " "
Staph. Pyog. Aur. low " " $2\frac{1}{2}$ " " "

Controls grew to the top of the agar in the tubes to 1 in. from top.

Six swabs of Diphtheria, Staph. and Strep.

Incubated after return in neutral bouillon: 72 hours.

Results: no growth.

Controls all became turbid, showing growth.

* O meaning all bacteria killed.

(5) 9,080 cu. ft.		1,320 c. c.		Closed 12:30.	Opened 8 p. m.
Serum cans.				Inclined agar tubes.	
Diph.	high	result	O	high; penetration to 2 in. from bottom.	
	low	"	O	low; penetration to 1½ in. from bottom.	
Typhoid	high	"	O	3 ft. from floor penetration to 2 in. from bottom.	
	low	"	O	3 ft. from floor penetration to 2¼ in. from bottom.	
Coli Com.	high	"	O	5 ft. from floor 3 in. from bottom.	
	low	"	O	5 ft. from floor 2¼ in. from bottom.	

Six dry swabs with infection of B. Diph., Staph., and Strep., incubated in natural bouillon 72 hours; result: no growth.

The agar tubes were used for the purpose of determining the penetration of the gas into small and confined places, and if it was present in sufficient quantities to destroy germ life.

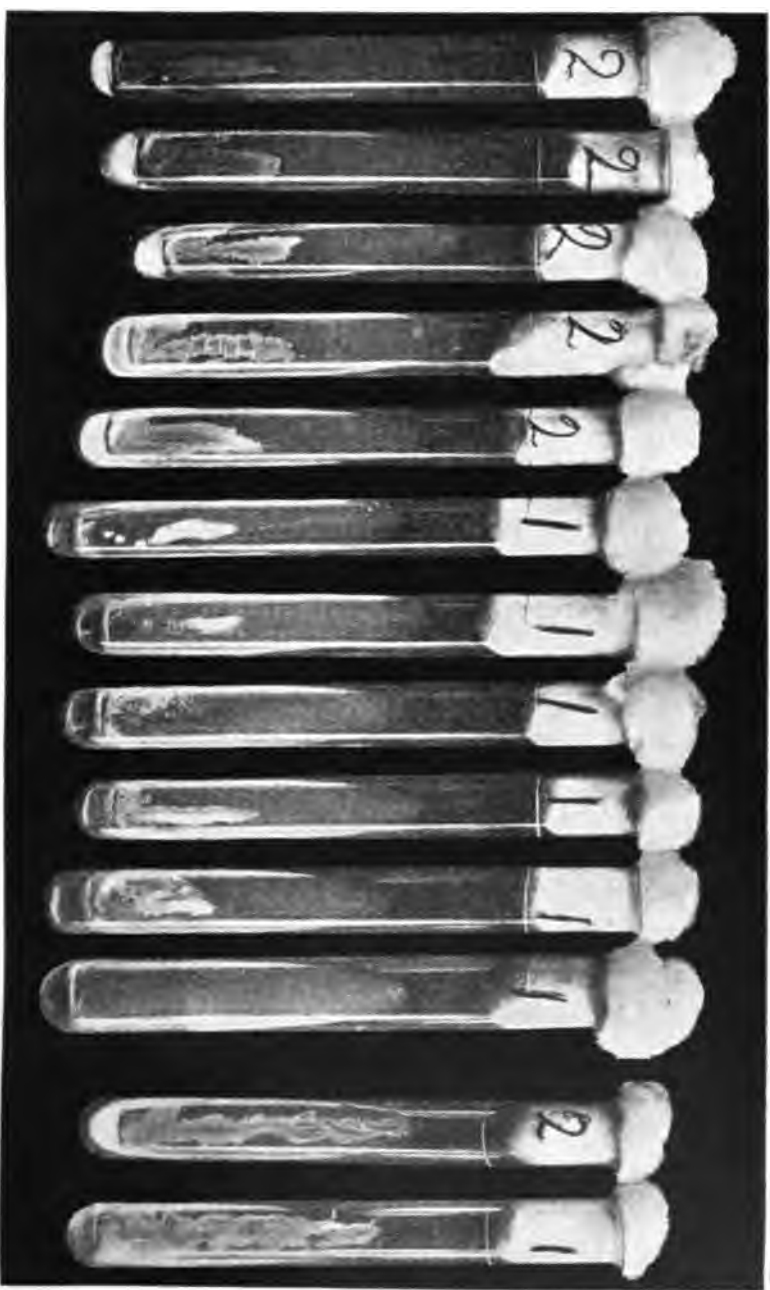
From the foregoing experiments one can at once see the value of formaldehyde as a disinfectant. Surface disinfection is complete. Where thick mattresses have been soaked with infectious material, it is recommended that they be sprayed with the solution and then folded together and left to lay for some time afterward. Penetration through fabrics occurs to a very great extent, but when too thick nothing short of a vacuum disinfection cylinder, with previous exhaustion of the air and then the admission of formaldehyde gas, would force it to the innermost parts.

In the course of hundreds of domestic house disinfections after contagious diseases, it is very seldom that a recurrence of disease is noted. When an *entire* house is disinfected there is *no possibility of a recurrence*, as is amply demonstrated by the reports of the Chicago Health Department disinfecting corps. Oftentimes disinfections are requested and performed before a case has really passed through the second or convalescing stage, and if then done disinfection is mere folly. A case should have absolutely recovered before the attempt at *general disinfection is undertaken*. Disinfection after small-pox has proven that formaldehyde gas is all that can be expected of it as a disinfectant. The cases after which it was performed ranged from the mildest to the severest types, with no recurrence of a single case in any of the premises where the work was done.

This method was demonstrated at the meeting of the American Medical Association in June, 1899, since which it has been very ably championed by many experimenters, and the system inaugurated by many health boards and quarantine stations, and also adopted for the disinfection of railway coaches by many of the great lines running into Chicago. A large number of coaches can be disinfected in one day. School boards are also using the method for the disinfection of schools, and in the last year the Board of Education of Chicago has applied the system in infected rooms and school houses, thereby checking an epidemic which seemed to have its origin in those schools.

The advantages of this system of disinfection are many—

First—Its simplicity and thoroughness.



A TEST OF FORMALDEHYDE DISINFECTION. FROM PHOTOGRAPHS.

A, C, F, G, H, K.—Tubes exposed with open mouths. B, D, E, I, J.—Tubes closed cotton plugs.
(Health Department Bulletin, May, 1899.)

Second—No burden or cumbersome generators have to be carried out, but the sprinkler and supplies can be carried in an ordinary hand satchel, and with an extra supply bottle enough can be taken at the start for three or four disinfections.

Third—Nothing is destroyed in the houses disinfected, as usually occurred after the old sulphur fumigation.

Fourth—Each room becomes its own source of disinfection.

Fifth—There is no fire or danger from explosions.

Sixth—It does not require hours of waiting on the part of the operator for the solution to evaporate, as is necessary when generators are used.

Entire disinfection is made as nearly perfect as can possibly be done; any person can thoroughly disinfect his own house, and it is the belief of the writer that the question of domestic disinfection has been solved.

CHAS. W. BEHM,
Bacteriologist Chicago Health Department.

XIX

DISINFECTION AND INDIVIDUAL PROPLYLAXIS AGAINST INFECTIOUS DISEASES*

(Revised by the Author in 1899)

INTRODUCTION

Definition. We are met at the outset by a difficulty growing out of the fact that the word *disinfection*, as commonly used, has a very different signification from that to which certain authors would restrict it. Thus, the Committee on Disinfectants of the American Public Health Association defines a disinfectant as "an agent capable of destroying the infective power of infectious material."¹ in the preliminary report of this committee the reasons for restricting the meaning of the word within the limits justified by its etymology, and of our knowledge of the nature of "infectious material," are very clearly stated, as follows:

"The object of disinfection is to prevent the extension of infectious diseases by destroying the specific infectious material which gives rise to them. This is accomplished by the use of disinfectants.

"There can be no partial disinfection of such material: either its infecting power is destroyed, or it is not. In the latter case there is a failure to disinfect. Nor can there be any disinfection in the absence of infectious material. * * *

"Popularly, the term disinfection is used in a much broader sense. Any chemical agent which destroys or masks bad odors, or which arrests putrefactive decomposition, is spoken of as a disinfectant. And in the absence of any infectious disease it is common to speak of disinfecting a foul cess-pool, or a bad-smelling stable, or a privy vault.

"This popular use of the term has led to much misapprehension, and the agents which have been found to destroy bad odors—deodorizers,—or to arrest putrefactive decomposition—antiseptics—have been confidently recommended and extensively used for the destruction of disease germs in the excreta of patients with cholera, typhoid fever, etc.

"The injurious consequences which are likely to result from such misapprehension and misuse of the word disinfectant will be appreciated when it is known that recent researches have demonstrated that many of the agents which have been found useful as deodorizers, or as antiseptics, are entirely without value for the destruction of disease germs.

*Lomb Prize Essay, by George M. Sternberg, M. D., LL.D., surgeon general United States army—reprinted by permission of Dr. C. O. Probst, Columbus, O., Secretary American Public Health Association.

¹The Medical News, Phila., Jan. 24, 1885, p. 87.

"This is true, for example, as regards the sulphate of iron or copperas, a salt which has been extensively used with the idea that it is a valuable disinfectant. As a matter of fact, sulphate of iron in saturated solution does not destroy the vitality of disease germs, or the infecting power of material containing them. This salt is, nevertheless, a very valuable antiseptic, and its low price makes it one of the most available agents for the arrest of putrefactive decomposition in privy vaults, etc.

"Antiseptic agents also exercise a restraining influence upon the development of these germs, and their use during epidemics is to be recommended when masses of organic material in the vicinity of human habitations cannot be completely destroyed, or removed, or disinfected.

"While an antiseptic agent is not necessarily a disinfectant, all disinfectants are antiseptics; for putrefactive decomposition is due to the development of 'germs' of the same class as that to which disease germs belong, and the agents which destroy the latter also destroy the bacteria of putrefaction, when brought in contact with them in sufficient quantity, or restrain their development when present in smaller amounts.

"A large number of proprietary 'disinfectants' so called, which are in the market, are simply deodorizers or antiseptics of greater or less value, and are entirely untrustworthy for disinfecting purposes."

The offensive gases given off from decomposing organic material are no doubt injurious to health; and the same is true, even to a greater extent, of the more complex products known as *ptomaines*, which are a product of the vital—physiological—processes attending the growth of the bacteria of putrefaction and allied organisms. It is therefore desirable that these products should be destroyed; and, as a matter of fact, they are neutralized by some of the agents which we recognize as disinfectants, in accordance with the strict definition of the term. But they are also neutralized by other agents—deodorants—which cannot be relied upon for disinfecting purposes, and by disinfectants, properly so called, in amounts inadequate for the accomplishment of disinfection. Their formation may also be prevented by the use of *antiseptics*. From our point of view the destruction of sulphureted hydrogen, of ammonia, or even of the more poisonous *ptomaines*, in a privy vault, is no more disinfection than is the chemical decomposition of the same substances in a chemist's laboratory. The same is true as regards all of the bad-smelling and little known products of decomposition. None of these are "infectious material," in the sense in which we use these words; that is, they do not, so far as we know, give rise *directly* to any infectious disease. Indirectly they are concerned in the extension of the epidemic "filth diseases," such as cholera, yellow fever, and of the fatal endemic filth diseases, such as typhoid fever and diphtheria, which in the long run claim more victims than do the pestilential maladies first named. This because persons exposed to the foul emanations from sewers, privy vaults, and other receptacles of filth, have their vital resisting power lowered by the continued respiration of an atmosphere contaminated with these poisonous gases, and are liable to become the victims of any infectious disease to which they may be exposed. Moreover, the accumulations of filth which give off these offensive gases furnish pabulum upon which certain disease germs thrive; and it may happen that the bad smelling air

carries something worse than the poisonous gas which makes its presence known by offending the sense of smell. It may waft to our nostrils infectious particles which are beyond recognition by any sense, unless it be the sense of sight with the aid of a good microscope.

We desire, moreover, to have it fully understood that in restricting the meaning of the term disinfection within the limits given by the definition of the Committee on Disinfectants of the American Public Health Association, we do not wish to limit the practice of "disinfection," in the popular sense of the word.

It is but fair to say, also, that this popular usage is supported by good authority, and until quite recently has been the common acceptance of the term among physicians and chemists. Indeed, it is but a short time since the nose test was the only test of "disinfection" recognized by many intelligent persons.

Littre, in his Dictionary of the French Language, defines disinfectants as "substances which destroy, chemically, bad odors."

Vallin, the author of a valuable treatise upon "Disinfection and Disinfectants," says,—

"From a scientific point of view there is perhaps an impropriety in introducing into the idea of disinfection the suppression of odors which offend the sense of smell. The bad odor is not injurious in itself; it is an epiphenomenon, which does not necessarily give the measure of the hurtful properties of the air, or of any substance whatever. The public, unacquainted with medicine, has an unfortunate tendency to judge of insalubrity by the bad odor; the absence of this gives to it a deceitful security; when they are masked by any device, it [the public] believes that all danger has been removed. *Nevertheless it is necessary to avoid violating the ordinary sense of words.*¹ An atmosphere which does not in the least offend the sense of smell may certainly be insalubrious, and engender the gravest maladies; but the fetid or disagreeable odors may reveal the presence of injurious principles, of toxic gases, or of organic matter in decomposition. We should not too much diminish the importance of these offensive odors in the eyes of the public; everything which smells badly is to be suspected."²

We agree with Prof. Vallin, that the bad odors should arouse suspicion, and lead to the use of deodorants, or of antiseptics, or of disinfectants, if required; but let us not leave the public to suppose that when the bad odors have been neutralized, the offensive material has been disinfected. Let us rather instruct the public that to deodorize and to disinfect are not synonymous terms. For our part we prefer to "violate the ordinary sense" of the word, and to restrict its signification within such limits as will prevent confusion, and, what is far worse, a reliance upon inefficient methods for the destruction of infectious material.

In the present essay we shall use the words disinfection and disinfectant, in accordance with the definition of the committee on disinfectants already given. But, inasmuch as this is intended to be a practical treatise for popular use, we shall also give, in the proper place, directions for the use of deodorants and of antiseptics, so that "disinfection," in the broad sense in which the word is commonly used, may be fully considered.

¹ Italics by present writer.

² Op. Cit., p. 2.

Tests of Disinfection. What means have we of proving that the infective power of infectious material has been destroyed?

Evidence of disinfection may be obtained (a) from the practical experiments—experience—of those engaged in sanitary work; (b) by inoculation experiments upon susceptible animals; (c) by experiments made directly upon known disease germs.

(a) It is a matter of common experience, that when a room has been occupied by a patient with an infectious disease, such as smallpox, scarlet fever, or diphtheria, susceptible persons are liable to contract the disease weeks or even months after the patient has been removed from it, unless in the meantime it has been disinfected. If a second case does occur from exposure in such a room, it is evident that it has not been disinfected. But the non-occurrence of subsequent cases cannot always be taken as evidence that the means of disinfection resorted to were efficient. Negative evidence should be received with great caution. In the first place, the question as to whether susceptible individuals have been fairly exposed in the disinfected room must be considered. Then it must be remembered that susceptible persons do not always contract a disease, even when they are exposed in a locality known to be infected. A further difficulty in estimating the value of evidence obtained in practice arises from the fact, that, in connection with the special means of disinfection resorted to, such as fumigation, hanging up cloths saturated with a disinfecting solution, etc., it is customary to resort to additional precautionary measures, such as washing surfaces with soap and hot water, white-washing plastered walls, and free ventilation. It is apparent that under these circumstances it would be unsafe to accept the fact, that no other cases occurred in a room treated in this way, as evidence that the particular disinfectant used is efficient for the destruction of the infectious agent of the disease in question. The fond mother who attaches a charm to her child's neck to protect it from evil, also takes the precaution of guarding it from contact with other children who are sick with any infectious disease. If her child fortunately grows to manhood or womanhood without having suffered an attack of scarlet fever or diphtheria, she may imagine that her charm has protected it, but the evidence upon which her faith is founded is not of a nature to convince those who are familiar with scientific methods of demonstration. "Well educated" persons are often ready to testify in favor of methods of disinfection, or of treatment, upon evidence which, from a scientific point of view, has no more value than that which the fond mother in question has to offer in favor of the little bag containing camphor or assafoetida, or some other charm of equal value, which she has attached to her child's neck to keep it from catching scarlet fever or diphtheria at school. On a par with these charms, so far as disinfection is concerned, we may place the saucer of chloride of lime, which it was formerly the fashion to place under the bed of a patient sick with an infectious disease, the rag saturated with carbolic acid, or chloride of zinc, suspended in the sick room, and even the fumigations with burning sulphur, as sometimes practiced by those who are unfamiliar with the evidence as to the exact value of this agent, and the conditions necessary to ensure successful disinfection with it.

Chloride of lime, sulphurous acid gas, and carbolic acid are among our most useful disinfecting agents, but disease germs are not to be charmed away by them any more than by a little bag of camphor.

Having pointed out the fact that negative evidence, in a restricted field of observation, must be accepted with great caution in estimating the value of disinfectants, we hasten to say that the combined experience of sanitarians, derived from practical efforts to restrict the extension of infectious diseases, is of the greatest value, and that this experience is to a great extent in accord with the results of exact experiments made in the laboratory.

(b) Inoculation experiments upon susceptible animals, made directly with infectious material which has been subjected to the action of a disinfectant, have been made by numerous observers. The proof of disinfection in this case is failure to produce the characteristic symptoms which result from inoculation with similar material not disinfected. Thus, Davaine found that the blood of an animal just dead from the disease known by English writers as anthrax or splenic fever (*Fr. Charbon*), inoculated into a healthy rabbit or guinea-pig, in the smallest quantity, infallibly produces death within two or three days; and the blood of these animals will again infect and cause the death of others, and so on indefinitely. This anthrax blood therefore was infectious material, which could be utilized for experiments relating to the comparative value of disinfectants. Davaine made many such experiments, not only with the blood of anthrax, but also with that of a fatal form of septicæmia in rabbits, which is known by his name. Other investigators have followed up these experiments upon infectious material of the same kind, and also upon material from other sources—*e. g.*, the infectious material of glanders, of tuberculosis, of symptomatic anthrax, of fowl cholera, of swine plague, etc.

It has been proved that the infectious agent in all of the diseases mentioned is a living germ, and that disinfection consists in destroying the vitality of this germ. But in experiments made with blood or other material obtained directly from diseased animals, the results would be just as definite and satisfactory if we were still ignorant as to the exact nature of the infecting agent. The test shows the destruction of infecting power without any reference to the cause of the special virulence, which is demonstrated to be neutralized by certain chemical agents in a given amount. All of the experiments made with the above mentioned kinds of virus have been made upon the lower animals; but there is one kind of material which it is justifiable to use upon man himself, and with which numerous experiments of a very satisfactory character have been made. This material is vaccine virus. Fresh vaccine, when inoculated into the arm of an unvaccinated person, gives rise to a very characteristic result,—the vaccine vesicle. The inference seems justified that any agent which will neutralize the specific infecting power of this material will also neutralize the smallpox virus. Thus far it has not been definitely proved that the infective agent in vaccine virus is a living germ; but the numerous experiments made have shown that the chemical agents, which have the power of destroying the various kinds of infectious material heretofore mentioned, have also the power, in about the same amounts, of neutralizing vaccine virus, as shown by its failure to produce any result when inoculated into an unvaccinated person. In these experiments the more careful investigators have taken the precaution of vaccinating the same person with disinfected and non-disinfected virus from the same source. A successful vaccination with the non-disinfected virus shows that the individual is susceptible, and the material good; failure to

produce any result is evidence that the potency of the disinfected virus has been destroyed by the chemical agent to which it was exposed.

(c) As already stated, it has been demonstrated that the infectious diseases of the lower animals, which have furnished the material for experiments upon disinfectants by the method of inoculation, are "germ diseases," and that the infectious agent is in each case a living microorganism, belonging to the class known under the general name of *Bacteria*. The bacteria are vegetable organisms, which, by reason of their minute size and simple organization, must be placed at the very foot of the scale of living things. But they make up in number and in rapidity of development for their minute size; and there is good reason for believing that the infectious diseases of man are also caused by pathogenic—disease-producing—organisms of the same class. Indeed, this has already been proved for some of these diseases, and the evidence as regards several others is so convincing as to leave very little room for doubt.

Many of these disease germs are now known to us, not only by microscopic examination of the blood and tissues of infected animals, but also by "culture experiments." That is, we are able to cultivate them artificially in suitable media, and to study their mode of development, etc., in the laboratory, quite independently of the animals from which our "pure cultures" were obtained in the first instance. The culture fluids used are prepared from the flesh of various animals; and when to one of these a certain quantity of gelatine is added, we have a "solid culture medium," upon the surface of which some of these germs will grow most luxuriantly. To start such a "culture," it is only necessary to transfer, with proper precautions, a minute quantity of the infectious material to the surface of our culture medium, or into a fluid which has been found to be suitable for the growth of the particular organism which we desire to cultivate. A second culture is in the same way started from the first, and so on indefinitely.

Now it is evident that these "pure cultures" furnish us a ready means for testing the power of various chemical agents to destroy the vitality of known disease germs, as shown by their failure to grow in a suitable culture medium after exposure for a given time to a given percentage of the disinfectant. Very many experiments of this nature have been made. The reader who desires fuller details as to the method of conducting such experiments, and of the results obtained, is referred to the preliminary reports of the committee on disinfectants of the American Public Health Association, published in 1885 in the *Medical News*, Philadelphia, and also published in full in the annual volume of the Association for 1888. We may say here, that the experimental data on record indicate that those agents which are efficient for the destruction of any one of the pathogenic organisms upon which experiments have been made, or of harmless species of the same class,—*e. g.*, the bacteria of putrefaction,—are efficient for the destruction of all, *in the absence of spores*. There is, it is true, within certain limits, a difference in the resisting power of different organisms of this class to chemical agents. This is not, however, sufficiently marked to prevent the general statement that a *disinfectant for one is a disinfectant for all in the absence of spores*.

The last clause of the above statement calls for an explanation, and certain details with reference to the mode of reproduction of disease germs.

All of the bacteria multiply by binary division; that is, one individual divides into two, and each member of the pair again into two, and so on. The spherical bacteria, known as *micrococci*, multiply only in this way, but the rod-shaped bacteria, or *bacilli*, also form spores. These spores correspond with the seeds of higher plants. They are highly refractive, oval or spherical bodies, which, under certain circumstances, make their appearance in the interior of the rods, which cease to multiply by binary division when spore formation has taken place. The point of special interest with reference to these spores is, that they have a resisting power to heat, and to the action of chemical disinfectants, far beyond that which is possessed by micrococci, or by bacilli without spores. The difference may be compared to the difference between a tender plant and its seeds to deleterious influences, such as extremes of heat and cold. Thus the spores of certain species of bacilli withstand a boiling temperature for several hours, while a temperature of 150° Fahr. quickly kills most bacteria in the absence of spores. A similar difference is shown as regards the action of chemical agents. Certain agents—*e. g.*, sulphurous acid gas and carbolic acid,—which are extensively used as disinfectants, have been proved by exact experiments to be quite impotent for the destruction of spores. This being the case, it is advisable, in practical disinfection, always to use an agent which has the power of destroying spores, in those cases in which the exact nature of the disease germ has not been demonstrated. The cholera germ of Koch does not form spores; and there is good reason to believe that the same is true as regards the germs of yellow fever, of scarlet fever, and of smallpox, which have not yet been demonstrated. This inference is based upon evidence obtained in the practical use of disinfectants, and upon certain facts relating to the propagation of these diseases.

A second general statement, which is justified by the experimental evidence on record, is, that *agents which kill bacteria in a certain amount, prevent their multiplication in culture fluids, when present in quantities, considerably less than are required to completely destroy vitality.*

An agent, therefore, which, in a certain proportion and in a given time acts as a "germicide" in a smaller quantity, may act as an *antiseptic*, *i. e.*, may prevent putrefactive decomposition by restraining the development of the bacteria of putrefaction. Antiseptics also prevent or retard the development of pathogenic bacteria. It follows from this that germicides are also antiseptics; but the reverse of this proposition is not true as a general statement, for all antiseptics are not germicides. Thus alcohol, common salt, sulphate of iron, and many other substances which are extensively used as antiseptics, have scarcely any germicide power, even in concentrated solutions, and consequently would be entirely unreliable as disinfectants.

Practically, antiseptics may accomplish the same result in the long run as we obtain in a short time by the use of disinfectants. If, for example, we prevent the development of the germs of cholera, or of typhoid fever, in an infected privy vault, by the continued use of antiseptics, these germs will in time lose their ability to grow, when introduced in to a suitable culture medium. But in the meantime there is always the possibility that some of them may escape, with the fluid contents of the vault, into the surrounding soil, and contaminate some well or stream from which drinking water is obtained. For this reason privy vaults, cesspools, and sewers should

never be allowed to become infected. All infectious material, such as the dejections of patients with cholera or typhoid fever, should be destroyed at its source, in the sick-room; or, if it is ascertained that such material has been thrown into a privy vault, the entire contents of the vault should be promptly disinfected. The same rule applies to infectious material thrown upon the ground, or wherever it may be.

Finally, we desire to emphasize the following propositions:

Disinfection consists in extinguishing the spark, killing the germ, which may light up an epidemic in the presence of a supply of combustible material—filth.

The object of *general sanitary police* is to remove this combustible material out of the way, so that no harm may result even if the spark be introduced.

Antiseptics and deodorants are useful when it is impracticable to remove offensive organic material from the vicinity of human habitations, but they are a poor substitute for cleanliness.

PART FIRST

DISINFECTION

It will be our aim in the present chapter to give reliable, practical directions with reference to the use of disinfectants, and the best methods of disinfection. Keeping this object in view, we shall recommend for disinfecting purposes only those agents named in the following list:

1. Fire.
2. Steam under pressure (20 pounds).
3. Boiling water.
4. Formaldehyd gas.
5. Chloride of lime (in solution).
6. Mercuric chlorid (in solution).
7. Carbolie acid (5 per cent solution).
8. Caustic lime ("quicklime").
9. Dry heat (230° Fahr. for two hours).
10. Sulphur dioxid.
11. Copper sulphate (in solution).
12. Zinc chlorid (in solution).

All of these agents, properly used, are effective for the destruction of the "germs" of the following named diseases: Tuberculosis, diphtheria, typhoid fever, yellow fever, cholera, smallpox, measles, pneumonia, epidemic influenza, erysipelas, hog cholera, chicken cholera, swine plague, infectious pleuro-pneumonia of cattle, and, in general, of all infectious diseases in which the specific germ does not form spores. The five agents at the head of the list may also be relied upon for the destruction of the spores of anthrax, tetanus, and symptomatic anthrax, which are the principal diseases in which it has been demonstrated that resistant spores are present in the infectious material by which they are propagated.

We shall first give a brief account of the conditions of successful disinfection with these agents, as established by experimental data, and afterward detailed directions for their employment under the various circumstances in which disinfection is required.

I. Fire It is hardly necessary to say that burning of infectious material,

infected clothing, etc., is an effectual method of disposing of it. This method of disinfection is always to be recommended, when practicable or consistent with a due regard for economy and the rights of individuals. As a rule, articles of little value, which have been soiled with infectious material, had better be burned; and this is especially true of old clothing and bedding. But we have other efficient methods of disinfection, which make it unnecessary to sacrifice articles of value except under unusual circumstances.

2. *Steam under Pressure* The disinfecting power of steam given off from boiling water in an open vessel does not differ from that of the water itself, but confined steam has a temperature corresponding with the pressure as indicated by a steam gauge. At twenty pounds pressure the temperature is about 230 degrees Fahr. (105 degrees C.); at twenty-five pounds it is about 240 degrees Fahr.; at thirty pounds it is 250 degrees Fahr. Moist heat at the lowest temperature named destroys the most resistant spores in twenty minutes, while a temperature of 240 degrees Fahr. is effective almost immediately.

3. *Boiling* In the absence of spores, bacteria are quickly killed at a temperature considerably below the boiling point of water, and it is safe to say that boiling for half an hour will destroy all known disease germs, including the spores of anthrax, which have less resisting power than the spores of certain harmless and widely distributed bacilli, which have been found to resist boiling for several hours.

As a matter of fact a temperature considerably below the boiling point of water (140-160 degrees Fahr.), destroys within a few minutes the germs of cholera, typhoid fever, diphtheria, pneumonia, erysipelas, and many other known disease germs.

4. *Formaldehyd Gas* Since the first edition of this "prize essay" was published (in 1886) the most valuable addition to our knowledge of disinfecting agents has been the discovery of the germicidal action of formaldehyd, and this gas is now largely used for the disinfection of clothing, hospital wards, etc., as a substitute for steam or for sulphur dioxid. But like these agents its action is superficial and it cannot be depended upon for the disinfection of mattresses, pillows, rolls of clothing or bedding, etc. As is the case with chlorine and sulphur dioxid its germicidal power is increased by the presence of moisture, and by a high temperature. By means of a vacuum chamber, in which the articles to be disinfected can be placed and the air exhausted prior to the admission of the disinfectant, the necessary penetration can be secured for such articles, when they are properly arranged. But disinfection of clothing and bedding by these agents (steam, sulphur dioxid, and formaldehyd), calls for special apparatus and the supervision of an expert in the practical use of such apparatus. Formaldehyd gas is irritating to the mucous membrane of the eyes and nose, but it is not poisonous. It is produced either by the application of heat to an aqueous solution of the gas (formalin), or by the oxidation of wood alcohol, or by the volatilization (by heat) of paraform. Various forms of apparatus have been devised for generating the gas. In the army the large "Formal Gas Generator" (No. 2) of the Kny-Scherrer Co., and the smaller apparatus manufactured by Chas. Lentz & Sons of Philadelphia, have been used with success.

5. *Chloride of Lime* (chlorinated lime, bleaching powder) This is one of the cheapest and most efficient of disinfectants. It should be packed in air-

tight and moisture-proof receptacles,—glass is preferable,—and should contain at least twenty-five per cent of available chlorine. It should be used in solution, which had better be made as required. An insoluble residue will be left, which may be removed by filtration or decantation. This, however, is not at all necessary. Chlorinated lime owes its disinfecting power to the presence of the hypo-chlorite of lime, a salt which is freely soluble in water, and which is quickly decomposed by contact with organic matter. Germs of all kinds, including the most resistant spores, are destroyed by this solution, but it must be remembered that the disinfectant itself is quickly decomposed and destroyed by contact with organic matter, and that if this is present in excess, disinfection may not be accomplished, especially when the germs are embedded in masses of material which are left after the hypo-chlorite of lime has all been exhausted in the solution.

6. *Mercuric Chloride* (bichloride of mercury, corrosive sublimate) This salt is well known as a deadly poison, which has long been used in domestic practice as "bug poison." It has germicide powers of the first order, and it is consequently a disinfectant which may be recommended for certain purposes, due regard being had to its poisonous nature, and to the fact that it is decomposed by contact with lead, tin, or copper, and that lead pipes are soon rendered brittle and worthless by passing through them solutions of mercuric chloride. Its potency in dilute solutions (1 :500 to 1 :4000) makes it comparatively cheap,¹ and the danger of accidental poisoning from such dilute solutions is not very great. The concentrated solutions should be colored, as a precaution against accident, for they have neither color nor odor to reveal their deadly nature.

A standard solution which contains four ounces to the gallon of water is of convenient strength for a concentrated solution, to be issued by manufacturers or health authorities, in properly labeled bottles. This may be colored with permanganate of potash,² or with indigo, or with aniline blue.

It must be remembered, in using this and other disinfecting solutions, that the condition relating to time of exposure to the action of the disinfecting agent is an important one. The experimental evidence relating to the germicide power of the mercuric chloride shows that the time of exposure being two hours, this salt may be safely recommended for the destruction of pathogenic organisms in the absence of spores in the proportion of 1 :2000 or even less, *provided that the micro-organisms to be destroyed are fairly exposed to its action.* The fact that the mercuric chloride combines with and coagulates albuminous material, interferes to some extent with its value as a disinfectant, and will be kept in view in the recommendations to be made hereafter relating to the practical use of this agent. Mercuric chloride is an efficient antiseptic in the proportion of 1 :15,000, and it exercises a restraining influence upon the development of the spores of the anthrax bacillus, when present in culture solutions, in the proportion of 1 :300,000 and even less.

7. *Carbolic Acid* The disinfecting power of carbolic acid has been fixed by experiments upon vaccine virus, and upon various pathogenic organisms. A saturated aqueous solution cannot, however, be relied upon for the destruction of spores; but in the absence of spores it is fatal to micro-organ-

¹ It costs about fifty cents a pound by the quantity.

² Ten grains to the gallon is sufficient.

isms in the proportion of two per cent, the time of exposure being two hours. Indeed, less than one per cent is fatal to several of the species of pathogenic micrococci which have served as test-organisms in the numerous experiments which have been made with this agent. Upon the recommendation of the famous Dr. Koch, the discoverer of the cholera spirillum, the committee on disinfectants, of the International Sanitary Conference of Rome (1885), has given this agent the first place for disinfecting soiled clothing, excreta, etc., in cholera. For excreta it is to be used in five per cent solution, and for clothing, etc., in two per cent solution. The experimental evidence upon record indicates that it may be relied upon in this proportion.

8. *Caustic Lime* ("Quicklime") All of the caustic alkalies have decided germicidal value, but quicklime is the cheapest and most generally useful. For the disinfection of excreta, in the sick-room or in sinks, privy-vaults, etc., freshly prepared "milk of lime" should be used, containing about one part by weight, of hydrate of lime to eight parts of water. This should be used freely—in quantity equal in amount to the material to be disinfected. The white-washing of exposed surfaces is a satisfactory method of destroying any disease germs which may have lodged upon such surfaces.

9. *Dry Heat* Dry heat is only to be recommended for the disinfection of such articles as would be injured by exposure to moist heat, or to a disinfecting solution. A properly constructed disinfection chamber or "oven" is absolutely essential, if dry heat is to be used. The experimental evidence on record shows that the destruction of spores requires a temperature which would injure woolen fabrics (140° C. for three hours). In the absence of spores, however, articles which are freely exposed for two hours to a temperature of 110° C. (230° Fahr.) may with safety be considered disinfected. In practice it will be necessary to remember that the penetrating power of dry heat is very slight, and that packages, bundles, or even articles loosely thrown one upon another, cannot be disinfected in this way.

10. *Sulphur Dioxid* (sulphurous acid gas) Fumigation with burning sulphur has long been a favorite method of disinfection. The experience of sanitarians is in favor of its use in yellow fever, smallpox, scarlet fever, diphtheria, and other diseases in which there is reason to believe that the infectious material does not contain spores. The experimental evidence on record shows that under certain conditions it is effective for the destruction of micro-organisms in the absence of spores, but that it is quite impotent for the destruction of these reproductive elements.

The presence of moisture adds greatly to the disinfecting power of this agent. It is freely soluble in water, one volume dissolving fifty volumes of the gas. It is therefore evident that a saturated aqueous solution is fifty times as strong as the pure gas—anhydrous. In aqueous solution, in the proportion of 1:2000 by weight, sulphur dioxid kills micrococci in two hours' time. In gas-tight receptacle it destroys the infecting power of vaccine virus dried upon ivory points, when present in the proportion of one volume per cent, the time of exposure being six hours. The same proportion destroys anthrax bacilli, without spores, from the spleen of an animal recently dead, dried upon silk threads, in thirty minutes (Koch). These facts show that sulphur dioxid is a valuable disinfectant; but the conditions of successful disinfection, as established by the experimental evidence, are,

that the material to be disinfected shall be freely exposed to its action for a considerable time, *in a receptacle which does not permit the gas to escape*. It must be remembered that disinfection of a thin layer of vaccine virus upon an ivory point, or of anthrax blood upon a silk thread, exposed in a gas-tight receptacle, cannot be taken as evidence that thicker layers of infectious material, attached to the surface of bedding and clothing, or enclosed in folded blankets, bundles of clothing, mattresses, etc., can be disinfected by the same amount of sulphur dioxide generated in a room which is not gas-tight. It has been shown, by carefully conducted experiments, that the escape of sulphurous acid gas from a bed-chamber or hospital ward is very rapid, in spite of the usual precautions for stopping up crevices when such a room is to be fumigated; and infectious material, enclosed in bundles or protected by folds of blankets, etc., may escape disinfection, after having been exposed for many hours in a tightly closed chamber containing ten volumes per cent of this gas.

11. Copper Sulphate This salt has been largely used as a disinfectant in France, and experiments show that in the proportion of one per cent, it is a reliable agent for the destruction of micro-organisms, in the absence of spores. It is much below mercuric chloride in germicide power, but is a better deodorant—not a better antiseptic—than the more poisonous salt. When we take into account its efficiency, it is comparatively cheap, and is to be recommended for certain purposes.

12. Zinc Chloride Solutions of chloride of zinc are largely used in this country and in Europe for disinfecting purposes. It is an excellent antiseptic and deodorant, but its power to destroy disease germs has been very much overestimated. It may, however, be relied upon for the destruction of pathogenic organisms, in the absence of spores, in solutions which contain from five to ten per cent of the salt.

GENERAL DIRECTIONS FOR DISINFECTION

In the sick-room we have disease germs at an advantage, for we know where to find them, as well as how to kill them. Having this knowledge, not to apply it would be criminal negligence, for our efforts to restrict the extension of infectious diseases must depend largely upon the proper use of disinfectants in the sick-room.

Disinfection of Excreta, etc. The dejections of patients suffering from an infectious disease should be disinfected before they are thrown into a water-closet or privy-vault. This is especially important in cholera, typhoid fever, yellow fever, and other diseases in which there is evidence that the infectious agent is capable of self-multiplication, in suitable pabulum, external to the human body. Vomited matters, and the sputa of patients, with these and other infectious diseases, should also be promptly disinfected. This is especially important in cholera, diphtheria, scarlet fever, whooping-cough, and tuberculosis. It is advisable, also, to treat the urine of patients sick with an infectious disease with a disinfecting solution.

For the Disinfection of Excreta, etc., in the sick-room, a solution of chloride of lime is to be recommended. This is an excellent and prompt deodorant, as well as a disinfectant. A quart of the standard solution (No. 1), recommended by the committee on disinfectants, of the American Public Health Association, will suffice for an ordinary liquid discharge in

cholera or typhoid fever; but for a copious discharge it will be prudent to use twice this quantity, and for solid fecal matter a stronger solution will be required. As chloride of lime is quite cheap, it will be best to keep on the safe side, and to make the solution for the disinfection of excreta by dissolving eight ounces of chloride of lime in a gallon of water. This solution should be placed in the vessel before it receives the discharge. The material to be disinfected should be well mixed with the disinfecting solution by agitating the vessel, and from thirty minutes to an hour should be allowed for the action of the disinfectant, before the contents are thrown into a water-closet or privy vault.

For the disinfection of liquid discharges in cholera, typhoid fever, dysentery, etc., a five per cent solution of *carbolic acid* may be used. This was recommended by the committee on disinfectants of the International Sanitary Conference, which met in the city of Rome in 1885, of which committee the distinguished bacteriologist, Prof. Robert Koch, was chairman and the present writer a member. The solution should be used in an amount at least equal to the material to be disinfected—better twice this amount. The time necessary to insure disinfection was fixed by the committee at four hours.

Milk of Lime, made by slaking fresh quicklime with water and mixing the resulting hydrate of lime with eight parts of water, is one of the best and cheapest agents for the disinfection of excreta in the sick-room, on the surface of the ground, in open sinks, etc. This milk of lime should be used in an amount at least equal to the quantity of material requiring disinfection.

Chloride of Zinc in ten per cent solution may be used to disinfect the dejections of those sick with cholera or typhoid fever, or *sulphate of copper* in a solution of the same strength (ten per cent), the amount of solution used being equal to the amount of material to be disinfected.

It will be best to burn cloths used to wipe away the discharges of the sick, and especially those used in wiping away the infectious material from the mouth and nostrils of patients with diphtheria or scarlet fever. Bits of old muslin may be used for this purpose, and should at once be thrown upon an open fire or gas stove arranged in the fire-place for this purpose.

Infected sputum may be discharged directly into a cup half full of the solution of chloride of lime recommended for excreta, or of Labarraque's solution.

Handkerchiefs, napkins, and towels used in wiping away infectious discharges, if worth preserving, should be at once immersed in one of the following solutions: Chloride of lime, two per cent; carbolic acid, two per cent; mercuric chloride, 0.1 per cent (=1 :1000).

Cloths used for washing the general surface of the body should also be disinfected with one of the above mentioned solutions; and attendants should invariably disinfect their hands by washing them in one of these solutions, when they have been soiled by the discharges of the sick.

Disinfection of the Person Labarraque's solution, diluted with twenty parts of water, is a suitable disinfecting solution for bathing the entire surface of the body of the sick; or convalescents, or of those whose duties take them into the sick-room; or a two per cent solution of carbolic acid, may be

used, or a solution of mercuric chloride (corrosive sublimate) of 1 :1000. The poisonous nature of this solution must be kept in mind.

The International Sanitary Conference of Rome gives the following directions with reference to the disinfection of the body after death from cholera:

"The body should be enveloped in a sheet saturated with one of the strong disinfecting solutions,¹ without previous washing, and should at once be placed in a coffin."

We see no objection to washing the body, if the strong solution of chloride of lime is used for this purpose. Washing with water would necessitate the careful disinfection of the water and cloths used for this purpose, and of the hands of the attendants. As the odor of chlorine or of carbolic acid would be objectionable under certain circumstances, we see no good reason for insisting upon the use of these agents, rather than on the odorless solution of mercuric chloride, which, in the proportion of 1 :1000, would no doubt be equally effective. But when there is an odor of decomposition to be neutralized, the solution of chloride of lime will have a decided advantage on account of its deodorizing properties.

Disinfection of Clothing and Bedding The cheapest and best way of disinfecting clothing and bedding, which is not injured by the ordinary operations of the laundry, is to immerse it in boiling water for half an hour or longer. It should be placed in boiling water as soon as removed from the person or the bed of the sick, and if it is necessary to remove the articles from the room in order to accomplish this, they should be wrapped in a sheet or towel thoroughly saturated with a disinfecting solution. If it is impracticable to disinfect such infected clothing and bedding *immediately* by boiling, it will be necessary to immerse it in one of the following disinfecting solutions, in which it should be left for four hours: Mercuric chloride, 1 :2000; or the "blue solution,"² of this salt and sulphate of copper, diluted by adding two fluid ounces of the concentrated solution to a gallon of water; or a two per cent solution of carbolic acid. The solution of chlorinated lime (two per cent) may also be used, but we give the precedence to the first mentioned solutions, because of the bleaching properties of this solution. The blue solution does not injure clothing, and is to be preferred for domestic use to a simple solution of corrosive sublimate, which in the concentrated form is highly poisonous, and without odor or color. When diluted as directed, this solution may, however, be used without great danger. The metallic taste of the diluted solution could scarcely fail to prevent a fatal dose from being swallowed accidentally.

Woolen garments and other articles which would be seriously injured by immersion in boiling water, or in one of the disinfecting solutions above mentioned, should be disinfected, in a properly constructed disinfection chamber, by steam or by formaldehyd gas.

Exposure to steam at 100 degrees C. (212 degrees Fahr.) for half an hour would be equivalent to exposure in boiling water for the same time, if the clothing is hung up in such a manner as to be fairly brought under the action of the disinfecting agent. To be certain that the steam does not fall

¹ Chloride of lime, four per cent, or carbolic acid five per cent.

² Bichloride of mercury..... 4 oz

Sulphate of Copper 1 lb

Water 1 gal

below this temperature in the disinfection chamber, a thermometer must be placed in a corner of a room, at a distance from the point of entrance of the steam, or in an aperture from which the steam escapes. This should mark at least 100 degrees C. for half an hour before the disinfection can be considered complete.* To accomplish this, it is evident that the steam must come from the generator at a higher temperature, or, in other words, must be under pressure.

It must be remembered that in a majority of the infectious diseases in which disinfection is most frequently required the specific germ does not form resistant spores (cholera, typhoid fever, tuberculosis, diphtheria, erysipelas, pneumonia, yellow fever, smallpox). In these diseases therefore it would be a mistake to forbid the use of carbolic acid, sulphur dioxide, and other agents which enjoy the confidence of sanitarians, and which have been proved by laboratory experiments to destroy pathogenic organisms in the absence of spores.

As disinfection by steam injures certain articles, *dry* heat may be used as a substitute for moist heat, but in this case a temperature of at least 110 degrees C. (230 degrees Fahr.), maintained for two hours, will be required. In the use of dry heat, even greater care is necessary that the articles to be disinfected are freely exposed,—that is not placed in the oven in bundles, or piled one upon another, but freely suspended in the disinfecting chamber. For it has been shown by carefully conducted experiments that the penetrating power of dry heat is very slight. A properly constructed disinfection oven, such as that of Ransom,† will be required if dry heat is to be used. But it will as a rule, be preferable to disinfect such articles in a steam disinfecting chamber of modern construction in which provision is made for exhausting the air before steam under high pressure is admitted, and in which, after disinfection, the clothing is rapidly dried before being removed from the steam chamber.

Sulphur Dioxide is a less reliable disinfectant than steam or dry heat, but when the necessary conditions are observed there is no doubt of its utility; and the fact that it does not kill the spores of anthrax and of other bacilli is no reason for rejecting an agent which has been demonstrated by experience to be one of great value, which has been proved by laboratory experiments to be fatal to pathogenic organisms in the absence of spores, and to destroy the infecting power of vaccine virus. But in using this agent the conditions of successful disinfection, which have been established by experiment, should be borne in mind. The room which is to serve as a disinfecting chamber must be very thoroughly closed; every crevice and key-hole should be carefully closed by fastening paper over it. Even this precaution will not prevent the rapid escape of gas from cracks around doors, windows, etc. It is therefore desirable, when practical, to use a disinfecting chamber which can be hermetically closed. The articles to be disinfected must be very freely exposed, and should never be thrown into the room in bundles, or piled one upon another. We concur in the recommendations of the committee on disinfectants of the American Public Health Association, as to the amount of sulphur which should be burned, and the method of effecting its complete combustion:

* The committee on disinfectants of the International Sanitary Conference of Rome fixes one hour as the time during which steam should be made to pass over articles to be disinfected

† *British Medical Journal*, Sept. 6, 1885, p. 274.

"To secure any result of value, it will be necessary to close the apartment to be disinfected as completely as possible, by stopping all apertures through which gas might escape, and to burn at least three pounds of sulphur for each thousand cubic feet of air-space in the room. To secure complete combustion of the sulphur, it should be placed, in powder or in small fragments, in a shallow iron pan, which should be set upon a couple of bricks in a tub partly filled with water, to guard against fire. The sulphur should be thoroughly moistened with alcohol before igniting it."*

Since the above was written with reference to disinfection by sulphur dioxide (SO_2) the valuable germicidal properties of *formaldehyd gas* have been demonstrated, and satisfactory methods of generating this gas for purposes of disinfection have been devised. Owing to its superior germicidal value and non-toxic properties it has to a considerable extent taken the place of sulphur dioxide as a gaseous disinfectant. In making practical use of this agent a suitable apparatus will be required. For the disinfection of a room with its contents, freely exposed for surface disinfection, one pound of formalin should be volatilized for each thousand cubic feet of air-space—the time of exposure to the disinfecting action of the gas being not less than twelve hours. When paraform is used the amount required will be sixty grams to 1,000 cubic feet (Novy). In the absence of any apparatus satisfactory results have been obtained by the Department of Health of city of Chicago, as follows:

"Ordinary bed sheets were employed to secure an adequate evaporatory surface, and these, suspended in the room, were simply sprayed with a forty per cent solution of formalin through a common watering pot rose-head. A sheet of the usual size and quality will carry from 150 to 180 cc. of the solution without dripping, and this quantity has been found sufficient for the disinfection of 1,000 cubic feet of space. Of course, the sheets may be modified to any necessary number. * * * Surface disinfection was thorough, while a much greater degree of penetration was shown than that secured by any other method."

Formalin may also be used in the disinfection of rooms and their contents by spraying all exposed surfaces.

Experiments made by Kinyoun and others show that formaldehyd gas does not injure the color or textile strength of fabrics of wool, silk, cotton, or linen, and that it has no injurious action upon furs, leather, copper, brass, nickel, zinc, polished steel or gilt work. Iron and unpolished steel are attacked by the gas.

We would remark, that in the absence of suitable appliances for disinfection, and in general when the disinfected articles are of little value, consumption by fire furnishes the readiest and safest method of disposing of such articles.

For articles of value, such as upholstered furniture, etc., which would be injured by any of the processes heretofore recommended, free exposure to the air (aeration) for three or four weeks is directed by the Committee on Disinfectants of the International Sanitary Conference of Rome. The same committee directs that "objects made of leather, such as trunks, boots, etc., should be destroyed or washed several times with one of the weak

* Preliminary report, I. C., p. 427.

disinfection solutions,"—carbolic acid two per cent, or chloride of lime one per cent

The means heretofore recommended for the disinfection of woollen clothing, blankets, and similar articles will not be sufficient for soiled mattresses. As a rule, they should be opened, and the contents disinfected by steam, with subsequent free æration, and the cover should be washed in boiling water after treatment with a disinfecting solution.

Finally, the valuable germicidal properties of direct sunlight have been demonstrated by numerous carefully conducted experiments and the time-honored domestic practice of hanging infected clothing and bedding in the "open air" is to be recommended. This should supplement disinfection by formaldehyd or sulphur dioxid.

Disinfection of the Sick-Room Every effort should be made to prevent a room occupied by patients sick with an infectious disease from becoming infected. Carpets, stuffed furniture, curtains, and other articles difficult to disinfect, should be removed at the outset. Indeed, nothing should be left in the room which is not absolutely required, and all furniture and utensils should be of such a character that they can be readily disinfected by washing with boiling water or with a disinfecting solution. Abundant ventilation and scrupulous cleanliness should be maintained, and a disinfecting solution should always be at hand for washing the floor, or articles in use, the moment they are soiled by infectious discharges. For this purpose a solution of chloride of lime may be used (4 per cent).

It is impracticable to destroy infectious material in an *occupied* apartment by means of gases or volatile disinfectants, for to be effective these must be used in a degree of concentration which would make the atmosphere of a room quite irrespirable. These agents are therefore useful only as deodorants. They are all more or less offensive to the sick, and will seldom be required, even as deodorants, when proper attention is paid to cleanliness and ventilation.

Daily wiping of all surfaces—floors, walls, and furniture—with a cloth wet with a disinfecting solution, is to be recommended. For this purpose a solution of chloride of lime (2 per cent), or of carbolic acid (2 per cent), or mercuric chloride (1 :1000), may be used.

By such precautions as have been indicated, the infection of the sick-room may be prevented, especially in those diseases, such as cholera and typhoid fever, in which the infectious agent is not given off in the breath, or from the general surface of the body, of the sick person. In smallpox and in scarlet fever there is greater danger that the infectious agent may remain attached to the surfaces of the room; for the atmosphere becomes infected from particles given off from the surface of the patient's body.

As already stated, the atmosphere cannot be disinfected while the room is occupied. There is much less reason for disinfecting it when the patient has been removed, and it is much simpler to renew it by throwing open the doors and windows than to attempt to disinfect it. Indeed, there will be no infectious particles to destroy, except such as are dislodged from surfaces, window ledges, etc., where they have settled as dust while the room was occupied; and if the precautions above recommended have been taken, the danger of such reinfection of the atmosphere will be reduced to a minimum.

Disinfection of the vacated room, then, consists in the destruction of all infectious particles which remain attached to surfaces, or lodged in crevices, in interstices of textile fabrics, etc. The object in view may be accomplished by thorough washing with one of the disinfecting solutions heretofore recommended; but most sanitarians think it advisable to "disinfect the room" with a gaseous disinfectant, such as formaldehyd or sulphur dioxid. If the "fumigation" with sulphur dioxid is resorted to, the directions given by the Committee on Disinfectants of the American Public Health Association should be followed, *i. e.*, three pounds of sulphur should be burned for every 1,000 cubic feet of air-space. But, as already stated, disinfection with formaldehyd gas is to be preferred (see page 15).

At the end of from twelve to twenty-four hours, doors and windows should be opened, and the room freely ventilated. After this fumigation, all surfaces should be washed with a disinfecting solution (chloride of lime two per cent, carbolic acid two per cent, or mercuric chlorid 1:1000), and afterwards thoroughly scrubbed with soap and hot water. Plastered walls should be white-washed.

Disinfection of Privy Vaults, Cesspools, etc. The contents of privy vaults and cesspools should never be allowed to accumulate unduly, or to become offensive. By frequent removal, and by the liberal use of antiseptics, such necessary receptacles of filth should be kept in a sanitary condition. The absorbent deodorants, such as dry earth or pounded charcoal,—or the chemical deodorants and antiseptics, such as chloride of zinc, sulphate of iron, etc.,—will, under ordinary circumstances, prevent such places from becoming offensive. Disinfection will only be required when it is known, or suspected, that infectious material, such as the dejections of patients with cholera, yellow fever, or typhoid fever, has been thrown into the receptacles.

In the Manual for the Medical Department of the United States Army the following directions are given:

92. When accumulations of organic material undergoing decomposition cannot be removed or buried, they may be treated with an antiseptic solution, or with freshly burned quicklime. Quicklime is also a valuable disinfectant, and may be substituted for the more expensive chlorid of lime for disinfection of typhoid and cholera excreta, etc. For this purpose freshly prepared *milk of lime* should be used, containing about one part, by weight, of hydrate of lime, to eight of water.

93. During the prevalence of an epidemic, or when there is reason to believe that infectious material has been introduced from any source, latrines and cesspools may be treated with milk of lime, in the proportion of 5 parts to 100 parts of the contents of the vault, and the daily addition of 10 parts for 100 parts of daily increment of feces.

Hospitals The directions already given in regard to disinfection of the sick-room and its contents apply as well to hospital wards in which patients with infectious diseases are treated. In addition to this, it will be necessary in hospitals to guard against such infectious diseases as erysipelas, septicæmia, puerperal fever, and hospital gangrene. The antiseptic treatment of wounds, in connection with a proper regard for cleanliness and ventilation, has practically banished these diseases from well regulated hospitals. Of the first importance in effecting this are the precautions now taken with reference to the disinfection of sponges, instruments, the hands of attendants, etc.

Instruments of silver, such as probes and catheters, may be disinfected by passing them through the flame of an alcohol lamp. Instruments of steel, gum catheters, etc., may be disinfected by immersion in a five per cent solution of carbolic acid, or in a 1:1000 solution of mercuric chloride. For instruments and vessels of copper, brass, and tin, boiling water, or the carbolic acid solution, may be used. Vessels of porcelain or glass may be disinfected by heat, or by either of the disinfecting solutions mentioned. Sponges should be kept permanently in one of the disinfecting solutions, or, what is better, may be dispensed with entirely for the cleansing of wounds. In place of them, irrigation with a disinfectant solution may be resorted to, or the discharges may be wiped away with some cheap absorbent material which can be burned after having been once used.

Patients in hospitals, with infectious diseases, will of course be kept in isolated wards. Everything which comes from such a ward should be disinfected, and the immediate attendants of the sick should not be allowed to visit other parts of the hospital without first changing their outer clothing for a recently disinfected suit, and washing their hands in a disinfecting solution. When relieved from duty their underclothing should also be disinfected; and they should take a complete bath with one of the weak disinfecting solutions heretofore recommended.

Disinfection of Water and Articles of Food The disinfection of drinking water on a large scale, in reservoirs, wells, etc., is impracticable. But it is a very simple matter to disinfect water which is suspected of being contaminated with the germs of cholera, typhoid fever, or any other disease transmissible in this way. This is readily accomplished by boiling. As already stated, all known disease germs are destroyed by the boiling temperature maintained for half an hour. The importance of this precaution during the prevalence of an epidemic of cholera or typhoid fever cannot be over-estimated, when the water used for drinking purposes comes from an impure source, or is liable to contamination by discharges of patients suffering from these diseases. Those articles of food, and especially milk, animal broths, etc., which might serve as pabulum for disease germs, should, during the prevalence of an epidemic, be cooked but a short time before they are eaten. And such food, if put aside for hours after it has been prepared, should always be again subjected to a boiling temperature shortly before it is served. Food which gives evidence of commencing putrefaction is unfit for use, and in time of epidemics is especially dangerous.

Disinfection of Ships It should be the aim of a physician attached to a passenger ship, or of the master of a vessel having no physician on board, to prevent the vessel from becoming infected when in an infected port, or when cases of infectious disease occur on board. This is to be accomplished by keeping the ship clean; by disinfecting suspected articles, and especially the soiled clothing of passengers, before they are received on board; by the isolation of cases of infectious disease which occur on board; and by the thorough execution of those measures of disinfection recommended for the sick-room. When a case of cholera or of yellow fever occurs upon a ship at sea, it cannot be taken as evidence that the vessel is infected unless at least five days have elapsed since the person attacked came on board. For he may have contracted the disease from exposure at the port of departure, or in some other locality on shore. When, however, a longer time than this

has elapsed, or when several cases develop in a particular locality on ship-board, either simultaneously or successively, the vessel must be considered infected, unless it is shown that the cases are directly due to the opening of baggage containing infected clothing.

In practice, the sanitary officials at the port of arrival usually treat a vessel as infected if any case of infectious disease has occurred upon her during the voyage. This is a safe general rule, which should not be departed from unless a considerable time—five or seven days—has elapsed since the cases occurred, and they can be clearly traced to exposure before coming on board. In this case, if the ship is clean and the precautions relating to disinfection and isolation of the sick have been faithfully executed, the health officer may be justified in dispensing with the general measures of disinfection which are required for an infected ship.

These measures do not differ from those heretofore recommended for the disinfection of the sick-room and its contents; but the special conditions on shipboard, and the great interests at stake, make it essential that the execution of these measures should be in the hands of sanitary experts.

In the disinfection of ships, fumigation with sulphurous acid gas has been largely practiced by those in charge of quarantine establishments. The fact that the ship may be almost hermetically closed, and the escape of gas to a great extent prevented, makes this method of disinfection more trustworthy than in the case of dwellings and hospitals. The further fact, that certain parts of the ship are inaccessible for the application of disinfecting solutions, seems to make the use of a gaseous disinfectant imperative.

Disinfection by means of steam, especially of an iron vessel, would no doubt be a difficult matter on account of the condensation which would occur from contact with the cool walls of the vessel below the water-line. But it will be well to fill the vessel with steam before introducing the sulphur dioxide; for as already stated, the disinfecting power of this agent is much greater in presence of moisture. A well equipped quarantine establishment should have an apparatus for generating sulphurous acid gas, and injecting it into vessels, as this is the most expeditious and satisfactory method of fumigating a ship.

An essential part of the disinfection of a ship will consist in the thorough cleansing of the bilge. The International Sanitary Conference of Rome prescribed that the bilge water shall be pumped out and replaced by sea water at least twice at each disinfection of the vessel.

Merchandise Article V, of the Report of the Committee on Disinfection of the International Sanitary Conference of Rome, says:

“V. Disinfection of merchandise and of the mails is unnecessary. (Steam under pressure is the only reliable agent for the disinfection of rags—*les chiffons en gros*.)”

We think this statement too broad, especially so far as merchandise is concerned which has been on board a ship infected with yellow fever. The poison of this disease seems to be capable of self-multiplication on a foul ship in tropical latitudes, quite independently of passengers and crew. And there is ample evidence that even where no case has occurred on an infected ship at sea, those who are engaged in discharging her cargo after arrival in port may be seized with yellow fever from breathing the infected atmosphere of the hold. Evidently merchandise conveyed on such a ship should be dis-

infected. But it does not seem necessary to break packages which have gone on board in good condition, and a thorough fumigation with sulphurous acid gas will be sufficient if the unbroken packages are so distributed as to be fairly exposed to the action of the disinfecting agent. To accomplish this, and to effectually disinfect the ship, it will be necessary to discharge the cargo at the quarantine station.

The collections of the rag-man cannot properly be placed in the same category with other merchandise, such as agricultural products, hardware, new cotton or woollen goods, etc. An exception with regard to rags is indicated, but not stated with sufficient precision, in the article which we have quoted. There is evidence that smallpox has been not infrequently transmitted in rags, and sanitarians are generally agreed that it would be very imprudent to admit rags collected in or shipped from localities infected with cholera or yellow fever, without first subjecting them to thorough disinfection.

PART SECOND

INDIVIDUAL PROPHYLAXIS AGAINST INFECTIOUS DISEASES

The state establishes quarantine stations, to guard against the introduction of infectious diseases of exotic origin; and in enlightened countries sanitary officials, under the direction of the central government, or of states and municipalities, are charged with the duty of guarding the public against such diseases. It is generally recognized that this is to be accomplished by the isolation of the sick, the use of disinfectants, and by general measures of sanitary police.

One way in which the individual may indirectly protect himself against such diseases is by using his influence to have this sanitary service placed in the hands of competent men, and in sustaining them in their efforts to exclude or stamp out infectious diseases by such measures as has been demonstrated by science and experience to be efficient for this purpose.

But this is not the kind of "individual prophylaxis" which we have to consider here. The question is, What can the individual do to protect himself and those immediately dependent upon him, under the various circumstances in which he may be placed, and especially in the presence of an epidemic?

As the advice we have to give will differ greatly according to the disease, we shall pass in review the principal infectious maladies of man, and shall attempt to give for each such practical instructions as will enable an intelligent person to take all practicable precautions for his own protection, and for that of his immediate family. We have first, however, to make some general remarks.

Infectious diseases are contracted by contact with the sick, through the medium of infected articles—"fomites"—or by exposure in infected localities.

The evident general rule of prophylaxis is, therefore, to avoid all of these sources of infection; but there are circumstances in which this is either impossible or unjustifiable. Duty calls the physician and the nurse into the sick-room, and no argument based upon self-protection can keep the devoted mother from the bedside of her sick child; or the wife from giving her personal attention to her husband, or the husband to his wife, when stricken

by pestilence. Humanity requires that during an epidemic the sick shall be cared for, the dead buried, and the foul places cleansed. All this calls for the active and intelligent efforts of persons who have the courage to face danger, and not only of those who by their profession are necessarily brought in contact with the sick—physicians, clergymen, sanitary officials, nurses—but often, also, of volunteers; for, during the prevalence of an epidemic of cholera, or of yellow fever, the number of physicians and trained nurses within the affected area is commonly insufficient for the care of the sick.

The history of epidemics shows that brave men and women are to be found in every civilized country, who are willing to volunteer for such perilous duties; and also that physicians, and those whose legitimate duty it is to care for the sick, very rarely desert their post in time of danger; but the mortality among these brave men and women who stand by their guns, and among the volunteers who go to their assistance, is often very great. There is a widespread notion among people not familiar with the facts, that doctors enjoy a certain immunity from infectious diseases not possessed by other people, and that the absence of fear is a safeguard against infection. Such a supposition is without foundation, and is an insult to the brave men and women who fall at their post of duty in every epidemic. Courage is no more a protection against disease germs than against bullets. It is true, that in epidemics, as in war, the sulkers and cowards often run into danger which the men in the ranks escape. The rashness which results from ignorance or from thoughtlessness is not courage, any more than the prudence which avoids danger when there is no good reason for facing it is cowardice. Those who rashly venture within the lines drawn by an epidemic, in the pursuit of business or pleasure, on the supposition that they will escape the prevailing disease because they are "not afraid," often fall victims to their unreasoning temerity, and not infrequently beat a hasty retreat, with blanched face, when they are brought directly into the presence of the sick and dying.

Our advice to the brave is, Do not put your trust in your courage, for it is no armor against infection. Rely rather upon those precautions which science and experience indicate as best suited to the special circumstances in which you may be placed, and do not hesitate to retreat before an invisible foe, when you are not required by considerations of duty to remain upon the field of battle. If your services are not required, you are simply in the way; and if you fall ill, you add to the labors of those who devote themselves to the care of the sick. And to the timid we would say let not your fear control your actions, but look the circumstances fairly in the face, and be guided by reason and knowledge, or by the advice of those competent to decide for you. A premature flight may bring you into ridicule, or into greater dangers than those you flee from. Do not let your fears exaggerate the facts, and weigh these in the balance of your reason, and not of your apprehensions. The fact that Judge A or Col. B has fallen a victim to cholera or yellow fever is no more reason for deserting your home than is the fact that the humblest citizen of your town has died from the same disease.

If courage is no protection against infection, it cannot be denied that fear, in the presence of the infectious agent, is a predisposing cause which frequently determines an attack, and which may turn the balance in favor of a fatal result. The depressing effect of fear is well known, and all

influences which reduce the vital resisting power of the individual predispose to an attack when an epidemic is prevailing.

Other predisposing causes of a general nature are those conditions of enfeebled resistance which result from ill-health, venereal, and bacchanalian excesses, etc.

Of all these, it is probable that excessive indulgence in intoxicating drink is the most potent factor in swelling the mortality returns during the prevalence of pestilential diseases. The predisposing cause acts in several different ways. The individual whose reason is befuddled by drink, stumbles stupidly into all kinds of danger. He is "not afraid" to sleep upon the ground, exposed to the night air, when yellow fever is prevailing, or to quench his thirst with water which a prudent man would reject as unfit to drink in the presence of cholera, or to wrap himself in a blanket which has recently been in use by a patient with smallpox. Again, the debility, often attended with digestive derangement, which follows a recent debauch, constitute a most favorable condition for the reception of the germs of cholera, of yellow fever, and of infectious diseases generally. Those who use intoxicating drinks habitually, but within the limits marked by that mental aberration or loss of reason which constitutes intoxication, are less subject to infection than the man who is suffering from the effects of a recent "spree." But if they have any organic disease of the stomach, the kidneys, or of the liver, as a result of their habits, this constitutes a predisposition to be attacked, and is a very serious complication when an attack is developed.

Persons suffering from chronic wasting diseases, profuse discharges, or recent hemorrhage, are especially liable to become the victims of an infectious disease during its epidemic prevalence. The same is true of those whose vital resistance is below par from insufficient food, or from the continued respiration of vitiated air—crown poisoning, sewer-gas poisoning, etc.

In addition to the predisposing causes mentioned, which furnish indications of more or less value with reference to individual prophylaxis, there are individual and race differences in susceptibility to certain diseases manifested by those who are in perfect health. One man may be repeatedly exposed to an infectious disease without falling sick, while another may suffer several attacks of a disease, such as smallpox, in which one attack commonly confers immunity. Race differences in susceptibility are shown in the relative immunity of the negro from the effects of the yellow fever poison, and the great susceptibility of the same race to smallpox.

We shall consider in detail the question of individual prophylaxis against certain infectious diseases, which, by reason of their fatality and occasional widespread epidemic prevalence, seem entitled to special attention in an essay of this nature.

Cholera In Asiatic cholera the danger of infection from association with the sick, in the capacity of nurse or physician, is very slight. This is amply demonstrated by experience. On the other hand, laundresses, who do not come directly in contact with the sick, but who handle clothing soiled by their discharges, are liable to contract the disease. By far the greater number of cases, however, result from exposure in infected localities, and from drinking infected water. Outside of the area in India where cholera prevails as an endemic disease, localities become infected and the water supply con-

taminated as a result of the introduction of infectious material from previously infected localities, either in fomites, or through the medium of the discharges of the sick. These facts furnish the indications for individual as well as for general measures of prophylaxis.

In the sick-room the precautions to be taken are, to keep the room clean and well ventilated, to disinfect the discharges of the sick and all soiled articles as promptly as possible, and to wash the hands in a disinfecting solution when they have been in contact with the patient or with soiled clothing. Attendants should not take their food in the room occupied by the sick, and should not drink liquids which have been exposed in the sick-room.

The general directions relating to diet, drinking-water, etc., which we shall shortly give, apply to the attendants upon the sick, as well as to those at a distance from them; and it should be remembered, in the interest of the sick, that these attendants do not run any special risks beyond those to which all persons within the area of infection are exposed. Indeed, we may go further, and say that they run far less risk when they are in a well-regulated hospital and under intelligent supervision, than do those persons who dwell in the localities outside of the hospital from which the cases under their charge have come.

Attendants upon the sick should have their meals at regular hours, should not be deprived of a fair allowance of sleep, and should never be allowed to become exhausted by protracted vigils or excessive fatigue.

When cholera has been introduced into a country and is extending its limits from day to day, one of the first questions which will present itself to those who are able to change their place of residence will be, whether they shall attempt to keep out of its way, and if so, where it is best to go. The answer to this question must depend very much upon circumstances. Those who are unfortunate enough to live in a city or town which has a bad sanitary record, which is not provided with an efficient health department, or does not provide money to enable the officers appointed to do efficient work, had better decamp in good time, so as to evade the foe entirely, or to meet it upon a field more favorable for defensive operations. There should be no stampede, and no running away in haste without any definite idea of why and where. The time to go is before the disease has fairly obtained a lodgment. Consider that if the season is not far advanced, and the town is in an unfavorable sanitary condition, there is every reason to anticipate that the first cases will be followed by a severe epidemic, and decide at the outset whether you will put your castle in order to stand a siege, trusting to well-considered measures of individual prophylaxis, or whether you will beat a masterly retreat in advance of the first assaults of the enemy. Those who vacillate, in the hope one day that the epidemic is on the decline, and in the fear the next that it will sweep everything before it, in the end very often stay, when they could just as well have gone, and at the same time neglect those precautions which they should have taken at the outset if they had decided to stay.

To those who are unable or unwilling to desert their homes, we would say, that when proper precautions are taken the danger is really not very great, and that sanitarians look for the day when cholera will be practically banished from civilized countries. See that your premises are in good sani-

tary condition, and do what you can to induce your neighbors and the authorities in your town to prepare for the storm. Look especially after the plumbing of your houses, and if there is a cesspool or privy vault upon your premises, see that it is kept in good condition by the use of antiseptics and deodorants.¹ Above all, see that no food comes into your house except such as is sound and good, and that the drinking-water used by your family is beyond suspicion. Well-water is always open to suspicion, and in general, during the prevalence of cholera, it will be advisable to *boil all water used for drinking purposes*. This is a prophylactic measure of prime importance, and there is good reason to believe that if faithfully executed it would, to a great extent, limit the ravages of the Asiatic pestilence. Tea and coffee recently made can be taken with impunity. Milk, during the prevalence of an epidemic, should be boiled before it is used as food. Mineral waters, if bottled at places distant from the infected area, may be drunk in moderation. A moderate amount of sound wine, which was bottled prior to the epidemic, may be permitted to those who are in the habit of using it. Those not in the habit of using stimulants should not resort to their use during the progress of an epidemic. Those accustomed to them should restrict their libations within moderate limits, and will find a little brandy and soda, or Apollinaris water, to be better than wines, and especially than the acid wines, which are apt to derange the digestion.

Food should be plain and well cooked, and should be taken in moderate quantities. Intemperance in eating is quite as bad as intemperance in drinking. Soups, meats, and vegetables should always be served hot, and should not be put aside for a future repast, or, if served a second time, should be brought to the temperature of boiling water shortly before they are eaten. Pastry and rich puddings, and all coarse and indigestible meats and vegetables, are to be avoided. Sound, ripe fruit, which has been brought to the house with the outer skin unbroken, may be eaten in moderation by those who know by experience that it agrees with them. It should be carefully washed before it is eaten. Melons, cucumbers, unripe apples, peaches, or pears, acid fruits generally, and, in short, all those articles which are known to give rise to digestive derangements in the absence of cholera, would better be banished from the supply-list during the prevalence of this disease.

Next to the precautions relating to food and drink, we would place these relating to personal habits and clothing. The bowels should not be allowed to become constipated, and, on the other hand, any tendency to diarrhœa should at once receive attention. This is a matter of the greatest importance, and, indeed, is second to none other in individual prophylaxis. *Absolute rest*, a light diet, and a dose or two of chlorodyne, or of Hope's mixture, or of any approved combination of an opiate and an astringent, will usually suffice to control a slight diarrhœa, even if it is of a choleraic character.

The clothing should be suited to the season, but great care must be taken that it is warm enough at all times to prevent the body from becoming chilled. A broad flannel belt worn about the abdomen is recommended by many physicians of experience, and is no doubt useful. Baths should be taken at frequent intervals, but should not be too prolonged or too cold, and should

¹ See Part First of this essay for details relating to the use of these agents.

be followed by a vigorous rubbing of the surface, to establish reaction. Excessive exercise and fatiguing labor of all kinds are to be avoided. One should never feel "done up," as a result of his exertions in the way of business or of pleasure, for the lassitude resulting from over-exertion, like that which results from fear, predisposes to an attack. Mental depression is, so far as possible, to be avoided; grief, despondency, and "carking care" are recognized as predisposing causes in cholera and in other infectious diseases.

The use of "sulphuric acid lemonade"—that is, of pure water acidulated with this acid and sweetened to taste—has been recommended as a prophylactic, and there is some evidence in favor of its usefulness. We would not advise its indiscriminate use, or that of any other prophylactic of this nature. When cholera has made its appearance in a dwelling or in a public institution, the inmates may be given this, to the exclusion of all other drinks.

Yellow Fever This disease, like cholera, is contracted in infected localities, rather than by contact with the sick. Indeed, it is rarely, if ever, communicated directly by a sick person to his attendants. In infected places the poison seems to be given off from the soil, or from collections of decomposing organic matter, and we have no definite evidence that it is communicated through the medium of food or drinking water. The history of epidemics of this disease shows that when it obtains a lodgment in a city or town which is in an insanitary condition, in southern latitudes and during the summer months, it extends its area and invades new localities similarly situated, until frost occurs, or at least until the weather becomes comparatively cool in the autumn. Those who remain in an infected area, unless protected by a previous attack, are almost certain to contract the disease, and much less can be done in the way of individual prophylaxis than in cholera. We therefore advise all those who can get out of the way of this fatal disease to do so. As a rule, there will be plenty of time, after there is evidence that the disease has established itself in certain parts of a city, for those who live at a little distance from these centers of infection to get away, in a deliberate and well considered manner. The occurrence of one or more imported cases cannot be taken as evidence that an epidemic will follow, and is no reason for deserting one's home. If proper precautions are taken by the sanitary authorities, it is very probable that no evil result will follow such importation of the disease. But when these imported cases are followed by the occurrence of other cases in the vicinity where they have been sick, or when such local cases occur in the vicinity of wharves where vessels from infected ports discharge their cargoes, or in sailors' boarding houses, etc., it must be taken as evidence that the disease has effected a lodgment, and that infected centers have been established, from which an epidemic will in all probability be developed, if the season is favorable and the city in an insanitary condition.

An epidemic is not developed so rapidly as in the case of cholera, but the disease usually extends its limits in a very deliberate way, and while it is claiming its victims in one section of a city, other sections in the immediate vicinity might be quite healthy. But the territory invaded remains infected until cold weather puts an end to the epidemic. Frequently it happens that no new cases occur in an infected area for several weeks, or even months, for the simple reason that all those who remained to do battle with the pestilence have suffered an attack or are protected by a previous attack. The

epidemic has ceased for want of material, but the infection remains, and will manifest itself if unprotected persons venture within the infected area from a mistaken idea that there is no more danger because there are no longer any cases.

In this disease, then, the most important point in individual prophylaxis is to keep away from infected localities, and from those places where the disease is epidemic—*e. g.*, Havana, Veracruz, Rio Janeiro—during the season of its prevalence. Very many lives have been sacrificed by a misplaced confidence in the protection which courage is supposed to afford against this disease. "I am not afraid," says the merchant whose business calls him into an infected city, or the sea-captain who wishes to obtain a cargo of sugar in Havana during the summer months. But not being afraid does not prevent such persons from being attacked. And the mortality in Havana among sailors from northern latitudes is very great. There is a tendency in places where the disease is endemic to underrate its malignity, and to ascribe every fatal case to some fault on the part of the unfortunate victim or his attendants. He was "frightened to death," or "was not properly nursed," or he was "imprudent," etc., etc. The mortality is no doubt largely influenced by these secondary causes, but yellow fever is a malignant disease, which under the most favorable circumstances is very fatal to unacclimated strangers within the limits of its endemic prevalence, and which in its epidemic extension in new territory often claims from 30 to 35 per cent, or even more, of those who fall sick, as its victims. This being the case, we repeat our advice to all those whose duty does not require them to stay on the field of battle, to make an orderly retreat to some place of safety.

The precautions relating to food and to personal habits do not differ materially from those recommended in the case of cholera. The diet should be simple, and excesses should be avoided. Less care will be necessary with reference to the use of fruits and vegetables—indeed, they are rather to be recommended, as better suited than animal food to the warm latitude in which this disease prevails. Constipation should, above all things, be avoided; and if there is evidence that the functions of the liver or kidneys are imperfectly performed, suitable medication should be resorted to.

There is no special danger from the use of water, if it is from a source which insures it from contamination with organic impurities. Spirituous liquors, if used at all, should be taken in great moderation. Nothing is more likely to develop an attack than alcoholic excesses, and the habitual drunkard is almost doomed to death if he falls sick with this disease. Exposure to the direct rays of the sun, excessive fatigue, and venereal excesses are all predisposing causes which it is within the province of individual prophylaxis to avoid. Exposure to the night air, and especially sleeping out of doors near the ground, is recognized by experienced physicians in yellow fever regions as an invitation to an attack. Great care should be taken to avoid chilling of the body, and it is well to sleep as far from the ground as possible. The creoles of Louisiana and the West Indies generally insist upon closing the windows of a sleeping-room at night.

The mortality among natives of tropical climates, and especially among those whose habits are good, and who are accustomed to a frugal mode of life, is very much less than among the natives of northern latitudes, when

these come, without any previous "acclimation," within the influence of the yellow fever poison. Those who are habituated to life in the extreme South enjoy a certain immunity from the effect of the poison, which is shown by a lower death-rate rather than any exemption from being attacked. One attack of this disease, as a rule, confers immunity from a subsequent attack.

Individual prophylaxis in an infected city will include the avoidance of those localities which give special evidence of being infected, and especial care not to visit such localities at night.

The liberal use of disinfectants in cesspools and water-closets, and a perfect state of sanitary police in and around the premises, will constitute a most important part of the precautionary measures which every individual should take for his own protection and that of his family. A state of mental equilibrium, and an intelligent appreciation of the special circumstances in which he is placed, and of the various measures of prophylaxis heretofore indicated, will enable an individual to look the facts fairly in the face, and to be governed by the light of reason and science. Unfortunately it too often happens, among the ignorant and degraded, that a spirit of bravado, attended with a neglect of the simplest sanitary precautions, and a disposition to deny the presence of the dreaded foe, prevails during the earlier stages of an epidemic, and that this is followed by a disorderly stampede and a disgraceful neglect of the sick, when the presence and malignant nature of the pestilence are recognized.

Smallpox This disease is contracted by exposure to emanations from the body of the sick, or from articles which have been in use by them, or exposed in their vicinity. There is no evidence that the smallpox poison multiplies external to the human body, and the indications for prophylaxis are therefore quite different from those already given for cholera and yellow fever. One may eat what he pleases, and wallow in filth, when smallpox is prevailing, without contracting the disease, so long as he keeps away from the sick, and is not brought in contact with any article infected by them. In this disease, however, as in the infectious diseases generally, previous personal habits will greatly influence the result when exposure does occur; and the disease is more fatal to the victims of alcoholism, to those who are poorly nourished, and, in general, to those whose vitality is reduced by exposure to noxious effluvia from putrefying material, by living in overcrowded and ill-ventilated apartments, etc.

As it is now the universal practice to isolate smallpox patients as soon as the disease is recognized, the danger of coming, accidentally, in contact with them is not great. There is but little danger of infection from passing within a few yards of a patient with smallpox in the open air, or from passing a building in which cases are under treatment. Unprotected persons who enter the sick-room are, however, extremely liable to contract the disease; and the infectious material given off from the patient's body clings most tenaciously to surfaces, to clothing, etc., and may give rise to an attack after many months, unless destroyed by disinfection.

It is evident, then, that individual prophylaxis will include the avoidance of places which have been occupied by the sick, and of articles used by them, unless there is a certainty that they have been thoroughly disinfected. It is probable that an unprotected person, who feels obliged, for special reasons,

to enter the sick-room, may escape infection by the use of an air filter placed over the mouth and nostrils. This should be constructed on the principle of the "Tyndal respirator," in which all inspired air is made to pass through a layer of cotton wadding, which arrests suspended particles. It would be necessary immediately on coming out of the room to burn the cotton filter, to bathe the hands and face in a disinfecting solution, and to change the outer clothing.

It is a general rule in regard to infectious diseases that those who are necessarily exposed to them should take the precaution of not going into the sick-room with an "empty stomach," or in a condition of exhaustion from any cause. A cup of coffee, or a glass of wine and a cracker, may be taken if a considerable interval has elapsed since the last regular meal.

It is well known that against smallpox we have a special measure of prophylaxis, which has restricted the ravages of this disease within the limits which are left to it by carelessness in regard to the application of this measure, or ignorance of its value. Since the famous discovery by Jenner, vaccination has become the prophylactic *par excellence*.

The immunity conferred by vaccination is, as a rule, complete; but there are exceptions to this rule, and vaccinated persons occasionally suffer from a modified form of the disease. The statistics of the London smallpox hospital show that the mortality among unvaccinated persons received into that hospital with smallpox, is 35.55 per cent; while the mortality among vaccinated persons is less than seven per cent. No doubt a large proportion of the cases of post-vaccinal smallpox might have been prevented by revaccination.

It is now recognized that the protective influence of vaccination is not always of a permanent character, and children who have been successfully vaccinated in infancy should be revaccinated when they reach the age of puberty, or sooner, if smallpox is prevailing in the neighborhood. The operation is so trifling that it is customary to vaccinate old and young with the exception of those who have been successfully vaccinated within a year or two, whenever an outbreak of smallpox occurs. This practice is to be recommended, but when the operation has been performed in a proper manner, with virus which is known to be reliable, it is folly to insist upon a frequent repetition of the vaccination, because "it didn't take." If the first vaccination has been completely successful, a *perfect* result from revaccination is not usually obtained; and the fact that no results is obtained must be taken as evidence that the person is protected. The prophylactic value of vaccination practiced after exposure to smallpox has been demonstrated, and one who is not entirely certain that he is protected by a recent successful vaccination will do well to resort to this important prophylactic measure at once, if he has reason to suspect that he has been exposed to smallpox.

Scarlet Fever In this disease, as in smallpox, the poison is given off from the bodies of the sick, and is not reproduced independently of them. As we have no knowledge of any means of protection corresponding with vaccination, prophylaxis consists solely in keeping out of the reach of infection by the sick, or by articles infected by them.

The sick person may communicate the disease during the whole period of his illness and convalescence—a period which often extends to five or six weeks, or even longer than this. Infected clothing, which has been packed away for months, may communicate the disease; and there are numerous

instances on record of its transmission to children at a distance from the sick, by healthy persons who have recently come in contact with scarlet fever patients. The lower animals, and especially pet cats and dogs which may have visited the sick-room unnoticed, or which are thoughtlessly given to convalescent children for their amusement, constitute a great source of danger. Persons who have suffered an attack of the disease, or who have but little susceptibility to it, may have a slight sore throat as a result of exposure to the scarlet fever poison, and may communicate the disease in its more severe form to unprotected children. One great difficulty in arresting the progress of an epidemic by isolation of the sick and disinfection, results from the fact that these slight and often unrecognized cases are frequently allowed full liberty.

Infection has been traced to milk which had been standing in the sick-room, or to the same liquid which had become infected in a dairy where scarlet fever had prevailed, and where recent convalescents were permitted to milk the cows.

All of the facts point to a most rigid exclusion of susceptible children from every possible source of infection. The susceptibility of adults is very much less, and, when attacked, they usually have the disease in a mild form. But their responsibility extends far beyond the point of avoiding the sick for their own protection. Those who are associated with susceptible children have no right under any circumstances to visit the room of a scarlet fever patient without taking the most thorough precautions with regard to the disinfection of their person and clothing immediately upon leaving it; and even with these precautions, such a visit cannot be justified when it is made simply out of curiosity or friendship. Only those who are in attendance upon the sick should be allowed in the sick-room, and they must be regarded as infected persons, who are not to be permitted to come in contact with unprotected children while they are engaged in this duty.

Diphtheria This is a disease in which the infectious material is given off from the surfaces affected, and not from the general surface of the body. As the usual seat of the disease is the throat and the nasal mucous membrane, it is the discharges from these surfaces which are especially dangerous. Although adults are much less susceptible to the disease than children, there have been numerous instances in which they have contracted diphtheria by the accidental reception of a bit of infectious material directly into the fauces. This is especially liable to occur during the operation of tracheotomy; and several physicians have lost their lives in this way, in their efforts to save those of their patients by aspirating through the tracheotomy tube. It seems extremely probable that the diphtheria bacillus is capable of increase independently of the sick, in damp, foul places, such as sewers, damp cellars, and especially under old houses in which the floors come near the surface of the ground, leaving a damp, ill-ventilated space. At all events, the disease often clings to such houses in spite of the application of the usual means of disinfection. There is no doubt as to the influence of bad hygienic conditions in maintaining the infection when the disease has been introduced, and it is possible that such conditions may, in certain cases, originate it.

Insufficient nourishment, the malarial poison, and insanitary surroundings are predisposing causes to the disease. Those suffering from scarlet

fever, measles, whooping-cough, and tuberculosis are also especially liable to be attacked. As in the case of scarlet fever, mild cases, which in the absence of others more pronounced it would be difficult to recognize as true diphtheria, may give rise to malignant diphtheria in more susceptible individuals, or in those whose vital resisting power is reduced by any of the causes mentioned.

Prophylaxis will demand complete non-intercourse with the sick, avoidance of infected localities, and care to exclude all persons and articles coming from such houses from contact with yourself or children. The disease is often spread by thoughtless persons who visit the sick-room, and even kiss the infected patients, and then, without any precautions in the way of disinfection, fondle healthy children in other places, and perhaps by a kiss transmit the infectious material which has adhered to their lips. The possibility of transmission by pet animals is also to be borne in mind.

It has been demonstrated by the bacteriologists connected with the health departments in our large cities that the diphtheria bacillus is often found in the throats of patients convalescent from this disease for three or four weeks after the attack, and exceptionally for a much longer time than this. The time when it will be safe for a convalescent from this disease to associate with susceptible children can therefore not be determined with certainty except by a bacteriological examination made by an expert.

The most important method of prophylaxis for children who are unavoidably exposed to the danger of infection is the use of protective inoculations by sub-cutaneous injection, of the diphtheria antitoxin. The value of this method has been amply and repeatedly demonstrated in children's hospitals, in asylums, and in private practice. The protection afforded by such inoculations is not permanent, and probably, as a rule, does not last longer than a few weeks.

Tuberculosis Scientific researches have demonstrated that tubercular consumption is an infectious disease, and that the sputum of those affected with it, injected into susceptible animals, reproduces in them the same disease. This sputum is therefore infectious material, and should be destroyed by burning, or by the use of chemical disinfectants. There would be little danger of infection from the moist masses of sputum, but in a dessicated condition this material is liable to reach the lungs of susceptible individuals, and to induce the disease.

It is well known that there is a great difference in susceptibility to pulmonary consumption, and that in certain families this disease carries off one member after another, while it is unknown in other families. Those who have this hereditary predisposition should pay special attention to individual prophylaxis. They should avoid intimate association with consumptive persons, should live under the best hygienic conditions, in dry, well ventilated apartments, and should select an occupation which will keep them in the open air, rather than one which keeps them confined to the house. Above all, they should avoid the respiration of an atmosphere loaded with organic impurities, or with irritating inorganic particles - dust of various kinds. Out of door life on the high and dry plains in the center of the continent, or in the mountains, will in most instances enable them to overcome the predisposition, if commenced before infection and the resulting tubercular lesions have occurred.

Those who are engaged in occupations which require them to pass some hours each day in an atmosphere loaded with dust will do well to wear a respirator for filtering the suspended particles from the air; for it is demonstrated that, independently of hereditary predisposition, the respiration of such an atmosphere predisposes to tubercular disease of the lungs.

Typhoid Fever In this disease, as in cholera, the infectious agent is contained in the alvine discharges of the sick. In the interest of self-preservation as well as in that of the public good, every individual who has charge of cases should see that the evacuations from the bowels are thoroughly disinfected before they are thrown out.

The drinking of water contaminated with such infectious discharges is recognized as a very frequent mode of infection; and individual prophylaxis demands an intelligent consideration of the source from which a supply of drinking water is obtained for personal or family use. If there is the least reason to suspect that this supply may be contaminated by typhoid material, or if it contains an undue amount of organic impurities, it should be rejected entirely, or boiled shortly before it is used.

Typhoid epidemics have in several instances been traced to using milk which had been contaminated by infected water, added to it directly, or used at the dairy for washing the vessels containing it. The remedy in this case is to verify the purity of the source of supply of all milk used for drinking, or to boil it immediately before it is used.

The water of wells located within the limits of a city or village should not, as a rule, be used for drinking purposes, for the soil is almost certain to be polluted; and it often occurs that the contents of privy vaults and cesspools pass into the same porous stratum of sand or gravel from which the well-water is obtained, or that surface drainage finds its way into shallow wells. It will be necessary, also, to regard with suspicion the water of small streams and ponds which are so situated that they may receive the drainage from collections of filth upon their margin.

Next to impure water we must place impure air as a factor in the etiology of typhoid fever. There is good reason to believe that the germs of the disease may be carried by the foul gases which are given off from sewers, privies, etc., when these become infected, and that the disease may be induced by the respiration of such a contaminated atmosphere. At all events, the breathing of a vitiated atmosphere, and insanitary surroundings generally, constitute predisposing causes which should be avoided.

There can be no doubt that typhoid fever, cholera, and other infectious diseases are not infrequently transmitted through the agency of insects, and especially of flies. These domestic pests are likely to light upon the excreta of persons suffering from infectious diseases, if it is left standing in receptacles of any kind, or is thrown without previous disinfection upon the ground or in shallow pits. From these foul places, with their feet and legs soiled by contact with material containing typhoid or cholera germs, they may fly to a neighboring kitchen and there light upon articles about to be served as food, or may fall into the milk jug, etc. This mode of infection is to be prevented by cleanliness, prompt disinfection of all infectious material and the use of suitable screens to exclude these carriers of infection from human habitations.

In typhoid fever, as in yellow fever and cholera, depressing mental emo-

tions, such as grief, despondency, or fear, and physical exhaustion from excessive fatigue, insufficient food, etc., are predisposing causes which may induce an attack in the presence of the infectious agent.

Malarial Fevers One of the latest and most important achievements of scientific medicine is the demonstration that malarial fevers are due to infection by a microscopic parasite which is found in the blood, and that the usual way in which such fevers are contracted is by the stings of infected mosquitoes. Fortunately not all mosquitoes are infected with this parasite. A certain species, found in marshy regions in tropical or sub-tropical countries, has been proved to be chiefly concerned in the transmission of these fevers to man. The evident measures of prophylaxis consists in avoiding the marshy regions where these noxious insects abound, and especially at night, when they are most active; or in the use of mosquito bars and other means of protection from the stings of these infected mosquitoes when in the vicinity of the places infected by them.

In addition to these precautions it is best to take from five to ten grains of quinine daily as an antidote to infection, when exposed in a decided malarious region. In giving these directions it must be remembered that they refer only to the typical malarial fevers which are contracted in marshy regions. The so-called "malaria" of cities is, as a rule, due to entirely different causes.

Concluding Remarks This chapter might be greatly extended, but, having passed in review the principal measures of individual prophylaxis against those infectious diseases which are most fatal, we shall not dwell upon precautions to be taken in other contagious diseases, such as measles and whooping-cough. These precautions will not differ from those already recommended in the cases of smallpox and scarlet fever. So, too, in regard to the infectious skin diseases. These are communicated by personal contact, and rarely occur except among those who neglect personal cleanliness, as well as other sanitary laws. Soap and water will generally suffice for individual prophylaxis. By avoiding filthy persons as well as filthy places, the danger of contracting these and certain other unmentionable infectious disease will be reduced to a minimum.

XXI

THE RELATION OF WATER SUPPLY TO ANIMAL DISEASES*

BY A. W. BITTING

Water is not a food within the strict meaning of the word, but it is necessary to the maintenance of animal life. It forms a part of every bone, muscle, nerve, and tissue in the body, and in such large proportions that it aggregates nearly 60 per cent of the total weight. In young animals the per cent is somewhat higher, and in old or very fat animals it is somewhat lower. Water is not only necessary because it is such an important component of the tissues, but also as an aid to digestion. Food can only be assimilated when in a soluble state, and hence a large quantity of water is required to carry on this physiological process.

It is not surprising that a relationship may exist between the water supply and disease. This relationship may exist in two ways: first, by not furnishing an adequate supply of water or not being accessible when needed; and second, by the water being the carrier of matter which may cause disease.

The quantity of water required by the different animals has not been determined for all conditions. The horse requires from sixty-four to eighty pounds, or eight to ten gallons per day, a gallon of water weighing eight pounds. During the months of February and March, five horses drank from forty-eight to sixty pounds per head when not at work, and from sixty-two to eighty-four pounds while at work. Forty-four per cent of the water was drunk in the forenoon and fifty-six per cent in the afternoon.

Cattle drink more than horses. During the period above referred to, cows not giving milk drank seventy-eight pounds, and cows in full flow of milk drank 112 pounds per day. The largest drink was 122 pounds and the greatest amount taken by one animal in one day was 176 pounds. The Utah Experiment Station¹ found that steers feeding upon dry feed required eighty-three pounds of water per day, while those fed upon green food consumed only thirty-three pounds per day.

Cattle drank seventy-two per cent of water in the morning and 28 per cent in the evening.

We have conducted no experiments to determine the quantity of water required during the summer months.

Our experiments to determine the quantity of water consumed by pigs,

* Bulletin No. 70 Purdue University Experiment Station, Lafayette, Indiana. Permit to reprint and use of cuts kindly granted.

¹ Utah Experiment Station bulletin No. 16. 1892.

were also conducted during the month of March. Four lots of pigs were being fed. Lot I received corn; lot II, wheat; lot III, corn and wheat, and lot IV, soaked wheat. Each hog also received three pounds of skim milk per day. Each hog in lot I drank 2.65 pounds of water; in lot II, 5.2 pounds, in lot III, 3.9 pounds; and in lot IV, 5.3 pounds of water per day.

No attempt has been made to determine the quantity of water needed daily for sheep, and I find no satisfactory tests recorded. Owing to the close grazing habits of sheep, they drink comparatively little water while upon pasture. They can endure privation as regards water far beyond other domestic animals. This has led to the common belief among farmers that sheep do not need water, and that the dew is sufficient. This is a serious mistake and accounts for the loss of many hundred lambs in this State every year.

The number of times an animal will drink during the day, when allowed full opportunity, is not known, but is indicated in a general way by the stomach.

The stomach of the horse is small, and, as might be supposed, does not require much water at a time, but often. The stomach in cattle is very large, and rumination (chewing the cud) is performed. This necessitates saturating the food with water before rumination can take place, and probably explains why so much water is drunk in the morning.

The diseases which arise as a result of supplying water in insufficient quantities, or not providing water in accessible places, are sporadic in character, that is, affect only an occasional animal or a few in a herd or flock. Probably the most serious disease having such cause is mad itch in cattle. This occurs especially in the fall of the year, when the cattle are upon dry pasture, or when turned in upon a dry stalk field. It may occur at other times, and also be due to other causes, but without doubt, ninety per cent of the cases occurring in this State are directly traceable to this cause. Sheep also suffer from impaction and constipation, and large numbers die for want of proper water supply. Hogs, especially young ones, often succumb from like treatment. Horses probably suffer least loss, because they receive the greatest care in this respect, but no doubt many cases of colic, impaction, and constipation are traceable to this source.

It is not the intent to give the symptoms or prescribe treatment for the diseases arising from an insufficient water supply, but to indicate that animals require large quantities of water, and that losses may be expected when not supplied in sufficient quantity or at the proper time. The remedy lies in prevention.

The losses that arise from an insufficient water supply are small compared with the losses that arise from supplying water of an improper character. Whether water will act as an agent for the carrying of the germs of disease, the ova, larvae, and special stages of parasites, will depend upon the source from which the water is obtained. If it comes from a deep well that is properly protected, these organisms will not be present. (See Fig. 14 showing 131 germs in water from tubular well 55 feet deep.) If it is obtained from the surface, as small ponds, ditches, and streams, they may be present. Not all surface waters are dangerous, but all are more or less exposed to infection and may become dangerous at any time. The time it becomes

dangerous cannot be detected by the eye, and may not be detected by laboratory tests.

The earth acts as a filter for all germs that fall upon it, no matter what may be their character. Only a small per cent will pass through the first inch of soil, and a very small number will pass through the first ten feet. In the first few feet of soil most disease germs are destroyed by the forms that inhabit it, but should they pass further down they are restrained only by the mechanical action of the earth. If, however, a soil becomes saturated with germs as for example in a barn-yard, or if the pollution is delivered below the surface, as in a cess-vault, little purification will take place, and the germs may find their way into nearby wells. In order to be certain of the water supply, wells should penetrate an impermeable layer of earth, and the sides be perfectly sealed, as with the iron tubular forms, so that no water can gain



FIG. 14—Showing 131 germs in water of tubular well 55 feet deep

entrance except from below. A tubular well twenty feet deep, is a much deeper well, from a sanitary standpoint, than a dug well of the same depth. It is also true that a shallow well may produce pure water at one time and afterwards become contaminated because of the saturation of the soil with germs, either by the barn-yard or vault.

Water from different sources has frequently been tested in the veterinary laboratory, and some conception of the number of germs that are present in water and the filtering property of the soil may be obtained from the follow-

ing. The quantity in each case is one cubic centimeter, or a half thimble full:

Source	Number of germs per cubic centimeter	
Very filthy hog wallow.....	2,680,000	
Ordinary hog wallow.....	730,000	1,420,000
Wabash river above Lafayette.....	12,000	32,000
Wabash river below Lafayette.....	112,000	390,000
Clean looking pond.....	290,000	
Filthy watering trough	248,000	
Stock troughs.....	5,000	21,000
Tile drains.....	8,000	
Six cisterns, without filters.....	5,000	91,000
Four cisterns, with filters.	580	3,000
Dug well receiving surface drainage.....	420,000	
Dug well 14 feet deep in corner of unprotected barn lot	398,000	
Eight tubular wells 60 to 150 feet deep.....	4	16

A test upon the filtering properties of the soil is as follows:

Depth	Number of germs	Number of germs after a heavy rain
Surface	518,400	312,000
1 inch	51,200	
2 "	28,800	
3 "	17,600	
4 "	17,600	
5 "	13,600	
6 "	13,200	47,500
8 "	8,000	
10 "	12,800	
12 "	5,200	16,000
18 "	10,400	
24 "	2,000	6,000
30 "	3,600	
36 "	4,000	4,300
42 "	3,600	
48 "	3,000	3,100
54 "	2,800	

The bacteria ordinarily found in water are not injurious, but the number present may always be taken as an index of its unwholesomeness. A large number, as shown in Fig. 15, indicates that it is easy for contamination to occur, while a smaller number may be accepted as an evidence of difficulty for extraneous germs to find entrance.

Of the different diseases of live stock in the State, none produce greater loss than hog cholera. For the year ending June 30, 1897, the loss was 899,457 head, valued at \$5,396,742. A careful analysis of the statistics for each township in the State shows that the streams play an important part in its distribution. In 1895 sixty townships bordering upon the Wabash from

Cass county to its mouth show a loss of 15 per cent of the entire product, and forty-seven townships in the second tier show a loss of 10 per cent. In 1896 the bordering townships show a loss of 29.4 per cent, the second tier 20.5 per cent, and the third tier 16 per cent. In 1895 forty-four townships bordering upon the north fork of the White river lost 13.8 per cent, and forty-two townships in the second tier, 6.5 per cent. In 1896 the loss in the first tier of townships was 23.1 per cent, in the second tier 15.6 per cent, and in the third tier 7.5 per cent. In 1896 forty-four townships bordering upon the south fork of the White river lost 20 per cent of the hogs; fifty-eight townships in the second tier lost 15 per cent, and forty-two townships in the third tier lost 10.9 per cent. In 1897, the first tier of townships lost



FIG. 15—Showing about 518,400 germs in surface water

32.1 per cent, the second tier 18.2 per cent, and the third tier 14.5 per cent. In other words, the losses in the bordering tier of townships is from 33 per cent to 112 per cent greater than in the second tier, and from 83 per cent to 208 per cent greater than in the third tier. In each case the difference in the per cent of loss in the different tiers is much less in the third year, as in that time the disease had become generally distributed. The statistics from 1882 to 1897 show the annual loss to be greatest along the rivers. These statistics have been presented because the number of townships involved is so large in each case that no local influences could have produced the result. The territory involved makes three long narrow strips in the State at distances sufficiently removed from each other, so that only a positive factor could show the marked differences that exist. The criticism is sometimes

made that more corn is grown along the river and more hogs are fed, which might account for the difference observed. This point has been carefully worked over, and no relationship is traceable to the number of hogs per square mile and the per cent of loss per square mile. An investigation made in 1895 and 1896 showed that the breeders of pure bred swine, who escaped hog cholera, nearly all used well water. Drs. Salmon and Smith came to this conclusion in their investigation of hog cholera.² "Perhaps the most potent agents in the distribution of hog cholera, are streams. They may become infected with the specific germ when sick animals are permitted to go into them, or when dead animals or any part of them are thrown into the water. They may even multiply when the water is contaminated with fecal discharges or other organic matter. Experiments in the laboratory have demonstrated that hog cholera bacilli may remain alive in water for four months. Making all due allowance for external influences and competition with the bacteria in natural water, we are forced to assume that they may live at least a month in streams. This would be time enough to infect every herd along its course."

If the larger streams have such a marked influence upon the percentage of loss along their courses, it is only reasonable to suppose that the smaller streams and ponds have a like effect. It is common practice to dig out a pond to receive the surface water from buildings and yards, to dam ravines and creeks, to catch the water from tile drains and springs for water for hogs as is illustrated in Fig. 16. In such cases it follows that they receive only surface water. It is apparent then, that the first step to be taken in the prevention of hog cholera, is the securing of a wholesome water supply,

All animals are more or less subject to parasitic diseases, and the intestinal tract, owing to its relation to the food and water consumed, becomes the favorite seat of attack. Countless numbers of germs, eggs, larvae, etc., enter with the food, but only a small part are in a proper state of development when they enter or they do not find suitable conditions for continuing life and therefore perish. Water plays a more important part as a carrier of parasites than does the food.

The life cycle of the parasites that affect animals, nearly always includes a stage of development outside of the body. Some parasites are passed out of the body as eggs. These hatch and after undergoing greater or less change, they may be prepared to again inhabit another animal. Some pass out, as larvæ, and after a certain time may infect an animal if taken in the stomach. A few require an intermediate host, as the liver-fluke, which infects the snail, and most tapeworms must usually pass one period of their existence in a different species of animal before they can again cause disease in another animal. Altogether the number of parasites which again find their way into another host, represent a very small per cent of the eggs produced. The eggs and larvæ of all these parasites contain a great deal of water and are easily killed by drying. Moisture is a necessary factor in their existence outside of the body, and hence it is that they are found in large numbers in surface water and are ingested (taken up) with it. Bacteria can stand drying better than parasites, but must have water in which to multiply. It follows then, that fewer parasitic diseases of stock will occur

² Report upon Hog Cholera, Bureau of Animal Industry. 1889, p. 124.

upon high pasture land when well water is furnished, than upon bottom land where they must depend upon a natural supply.

Among the most destructive parasitic diseases with which we have to contend, is the twisted stomach worm of sheep (*Strongylus contortus*). It is found especially on low lands along creek bottoms and around ponds. It affects sheep of all ages, but is particularly fatal to lambs. In 1896 it caused a loss of 50,000 lambs and sheep in this State. In seasons of excessive rainfall it may occur upon any pasture, but in ordinary seasons it causes little damage except upon the low pastures. The eggs and embryos are passed from the sheep and fall with the droppings upon the pasture, and may be washed into the streams or ponds from which the sheep drink. Moisture is necessary for their existence outside of the body, and the dryer the pasture, the less the opportunity for conveying the parasite from one sheep to



FIG. 16—Drinking water source in ordinary pig lot

another. In seasons of heavy rainfall, when the grass is kept constantly wet, the danger may be mitigated to a certain extent by changing the sheep from one pasture to another every other day.

Another disease of sheep that is conveyed in the same way, is the nodular disease. It is due to a small worm, and while it does not manifest itself until winter, the time the infection is spread from one sheep to another is during the summer months.

Such parasitic diseases as paper-skin, liver-fluke, and lung-worm of sheep, and the worms in hogs, horses, and cattle, are all conveyed in much the same way and are largely due to surface water. Pure water from deep wells is the prevention.

XXII

SEWAGE DISPOSAL IN CITIES AND TOWNS*

BY SEVERANCE BURRAGE

INTRODUCTION

A sewerage system is the necessary complement to the public water supply. This is so because the water is essentially the cleanser of the building into and through which it passes. It carries out of the house a vast amount of filth. As the neighborhoods become more crowded, it is obviously undesirable, and even unsafe, to saturate the soil with such polluted water, as would be the case were the old-fashioned cesspools used to receive it. Consequently it becomes necessary, sooner or later, to introduce a general system of sewerage to carry away the filth, not only from the individual houses, but from the city or town itself as well.

Primarily the problem is an engineering one. Pipes are laid in the streets, and these connected with the buildings, so that by gravity or pumping the sewage is removed. Should there be a river or lake, or the sea in the neighborhood, the sewage is oftentimes discharged directly into such body of water, and then allowed to take care of itself. Such a disposal of the sewage, while it may be convenient and inexpensive, is exceedingly unsanitary. It creates a nuisance and menaces the health of neighboring communities. Except in the case of the disposal into the sea, such a dangerous method should, if possible, be avoided. Therefore it is desirous to know whether or not raw sewage can be so treated as to render it inoffensive and safe when it is discharged into a body of water that has several communities bordering upon it.

It has been seen in previous bulletins how serious epidemics have been caused by using sewage-polluted streams and lakes as water supplies. Such streams and lakes, laden with raw sewage, are likely to become public nuisances, even if they are not utilized as a water supply.

It is important, then, from the standpoint of sanitary science, and also of modern civilization, that the municipality should, in some way purify and dispose of its sewage, that it may neither menace the health of its neighbors, nor in any way create a nuisance that would tend to lower the character of the surrounding country.

Serious outbreaks of typhoid fever, causing much loss of life, have gradually been awakening the people to the importance of this sewage-disposal

* Purdue University Monograph—No. 5—issued by the Department of Sanitary Science. Permission to reprint kindly granted by the University which is located at Lafayette, Indiana.

question, and today in the United States and Canada there are a large number of cities that have adopted some system of sewage purification. Several have resorted to the utilization of sewage for irrigation purposes, especially in California where irrigation has become a science by itself. A few towns have been forced to purify their sewage in some way because a neighboring city was obtaining its water supply from that region. Framingham and Marlboro, in Massachusetts, had to do this because the Boston water supply came from that neighborhood. But very few have introduced anything of this kind because it was the proper thing to do. It is something which makes little or no return in money, and this fact has undoubtedly been the chief reason for the non-introduction of sewage purification works. The people are apparently waiting until something valuable can be obtained from the sewage; until the income from the sewage plant shall exceed the outlay, which, as far as known today, is a result that cannot in most cases be secured.

It is well known, however, that sewage can be treated in several ways on a large scale so that an inoffensive and harmless effluent is the result, and, in the following pages, after a short description of what sewage actually is, some of these methods of sewage purification will be described and discussed.

SEWAGE—ITS NATURE AND COMPOSITION

Sewage is "the matter which passes through sewers: excreted and waste matter, solid and liquid, carried off in sewers and drains."¹ It is the "drainage water, together with the solid refuse conveyed in it."² Ordinarily sewage is made up of a large number of constituents. It contains the waste water from the kitchens, bath rooms and laundries; the urine, faeces, etc., from the water closets, and, in many cities the surface water that is collected in the street drains. As a result of this mixture we have an opalescent, more or less watery liquid, with considerable sediment, a disagreeable odor, and unpleasant and dirty appearance. Its color depends largely on the nature of the industries that are located in the community, certain establishments, such as dye-works, giving a variety of colors at different times.

American sewage is much more watery in appearance than foreign because it is so dilute. We have seen in a previous bulletin how our cities use much more water than foreign cities, and analysis shows that American sewage contains on an average about 99 per cent water and the rest mineral and organic matter. But sewage differs from water very materially in one respect, as it contains no free oxygen. This has all been used up in the oxidation of the organic matter present. It is not a simple chemical oxidation, however, the bacteria being most active agents in carrying on the decomposition. The more oxygen supplied in one way or another to the sewage, the more rapid and complete will be the decomposition of the organic matter. On account of this scarcity of oxygen, the organic nitrogen is only partially oxydized. In other words, we find this nitrogen as *free* and a *bumenoid ammonia*, *nitrites* in small quantities, but none as *nitrates*. This process of nitrification, carried on largely by micro-organisms, has a most important bearing upon our modern ideas of sewage disposal, particularly upon the results obtained by discharging the sewage upon the soil, or upon sand filters.

¹ Century Dictionary.

² Standard Dictionary.

An average sample of American sewage contains about one million bacteria per cubic centimetre, and it is because some of these may be the germs of disease that sewage is, from the sanitary standpoint, such a dangerous material. Sewage may contain the bowel discharges of persons suffering with some infectious disease; it may contain the water in which the clothing of diseased persons has been washed, and in numerous other ways it can receive material which contains the living germs of various diseases. Although, owing to the lack of oxygen, these bacteria do not as a rule multiply very rapidly in sewage, nevertheless they are there and the sewage is dangerous. They may even decrease in numbers, and yet their presence, even in very small numbers, is an indication that the danger is still there.

OLD METHODS OF SEWAGE DISPOSAL

The most common method of getting rid of city or town sewage has been and is to simply discharge the contents of the sewers directly into some body of water, as a river, or a lake, and then allow it to take care of itself. If discharged into the sea, the salt water has a decided precipitative action upon the sewage, rendering it much less offensive. But when this is done, it is of the utmost importance that all such refuse be discharged at such a time of tide that none shall be carried back to the beaches, where it would become a nuisance. But there are numerous cases in the United States where the raw, unpurified sewage of good sized cities is discharged into bodies of *fresh* water. The self-purifying power, a more or less uncertain factor, is depended upon to convert this dangerous, filth-polluted water into a safe and inoffensive liquid. Under favorable conditions, such as enormous dilution and swift currents, it is undoubtedly purified to a large degree, but even then the water could hardly be considered an absolutely safe drinking water.

This system of simply discharging the sewage into fresh water we will not regard as a method of purification. It is one which has caused a great deal of legislation in foreign countries as well as at home. It gave rise in England to the Rivers Pollution Commission. It is going to be given an extraordinarily good trial at Chicago, where the sewage is to be washed down the drainage canal by means of the lake water into the Illinois River. The authorities claim that the dilution will be so great that no disagreeable or dangerous effects will result to those living down the river.

MODERN METHODS OF SEWAGE PURIFICATION

The old theory that filth, containing pathogenic or disease-producing organisms, would, when exposed to the sun, propagate contagious diseases, has been entirely overthrown. Experimentally and practically, sewage has been discharged upon the land, which may or may not have been especially prepared to receive it, with the result that the pathogenic organisms and the offensive nature of the material are most effectively destroyed.

If the sewage be discharged on to a piece of land for the purpose of enriching the soil for raising crops, it is known as *irrigation*; if over a large area, *broad irrigation*. When it is poured upon the land, usually especially prepared, with no idea of raising crops, it is known as *filtration*; and as the best results are obtained by not pouring the sewage on such beds continuously, it is then spoken of as *intermittent filtration*. It is quite common to have a combination of the two methods, broad irrigation and intermittent filtration, which has given very good results.

The following description of a *broad irrigation plant* is given by Palm-burg.¹

BROAD IRRIGATION

The fields should be divided into sections 30 to 50 feet square, raised in the middle and having an equal slope. The sewage is conveyed by a culvert to the middle of the section. At certain distances in this culvert dykes are placed, causing the water to overflow on the slopes of the section.

The suspended matters in sewage tend to become deposited on the surface, forming a layer almost like a bed of felt. It may entirely cover the soil and choke the vegetation. In England its formation is prevented by means of reservoirs, in which the sewage stands, to allow of suspended matters being deposited. Solid matters may also be separated by a grating or precipitated by means of preliminary chemical treatment.

Winter, especially in cold countries, causes some difficulties in the application of irrigation. The absorptive power of the earth is feeble with a low temperature; there is no active growth of vegetation. Under these circumstances the system becomes one of simple filtration.

* * * From a sanitary standpoint, the system of irrigation has had a most satisfactory effect. Numerous critical observations, especially in England, have failed to show the origin of any case of contagious disease from it.

Since 1870, when the Rivers Pollution Commission proposed in their report the purification of sewage by irrigation of cultivated land, the system has been introduced into over 145 English towns.² Other European towns, including Berlin, Breslau, and Dantzic have also adopted it.

In America there are several good examples, among which are Wayne, Pa.; Pullman, Ill.; Berlin, Ont.; and Greenfield, Mass. Farther west, where water is scarce, sewage has been utilized for irrigation with considerable success. In California: Fresno, Pasadena, Redding, Los Angeles, Santa Rosa, and Stockton, all irrigate with sewage. In Colorado: Colorado Springs and Trinidad do the same; as do Helena, Mont., and Cheyenne, Wyo.

INTERMITTENT FILTRATION

The word filtration, as used now in connection with water and sewage purification, has come to mean much more than the simple mechanical removal of particles of mud, filth, etc., from the material being filtered. Certain chemical changes take place which can be accounted for only by the presence in the filter of living micro-organisms. Remove these *soil bacteria* by sterilization, and the filter loses for a time its power of purification. Furthermore, the filter is much more effective when air is present, and thus came the process of *intermittent filtration*, in which the sewage is poured upon the especially prepared filter bed for a definite time and then the filter is allowed to rest. The sewage, as it sinks into the soil, drags or sucks air after it, which apparently adds greatly to the vitality of the organisms in the filth. This, then, is the theory of intermittent filtration, that beside the actual sifting process of the sand, the filter itself has a vital action that is dependent more or less upon the air which the intermittent discharge of the sewage gives access to the interior of the filter. Thus the presence of the air increases the nitrifying or oxydizing power of the filter, both by virtue of the oxygen present in the air and by the additional activity which its presence lends to the micro-organisms.

Experimentally, much work has been done at the Lawrence (Mass.) experiment station upon intermittent filtration, where sewage was passed

¹ A Treatise on Public Health and Its Applications. Albert Palmberg, p. 140.

² Public Health and Its Application. Palmberg, p. 138.

through various thicknesses of various soils. It was found, among other results, that some forms of bacteria would pass through certain filters more readily than others; that in certain cases where the *numbers* of sewage bacteria had increased while the sewage was passing through the filter, the *kinds* of bacteria had greatly diminished, and so on.

Practically intermittent filtration has for some time been in operation at Gardner, Mass., Marlborough, Mass., Summit, N. J., Medfield, Mass., South Framingham, Mass., Brockton, Mass., and Hastings, Neb. The latter city being situated, as a good many western cities are, with no available outlet for their raw sewage, will be a good one to describe here in some detail as an example of considerable value. The facts are taken from Baker's Sewage Purification in America, in which the description was prepared by the engineer, Mr. J. M. Wilson of Omaha, Neb. As Mr. Baker¹ says: "One feature of the design and management of the Hastings plant is worthy of special notice and commendation. Purification is recognized as the first object to be obtained in disposing of the sewage, the raising of crops for revenue being made the second."

The land upon which the sewage is disposed is one and one-half miles from the city. It was graded into ten areas about two acres in extent, each area having its own level and separated from the adjacent areas by a low ridge of earth. These areas were brought to a uniform grade, except at the points where the sewage is received from the distributing gutters. Here the surface was slightly elevated to secure a better distribution of the sewage. The sewage is brought from the city by gravity to a settling and distributing tank, which is provided with cast iron gates for controlling the flow. Each area receives the sewage for a day or two at a time, followed by a rest until the sewage has been applied in succession to the other areas. The application of the sewage to the land creates no nuisance and causes but very little odor.

Brockton, Mass., has one of the most recently completed systems of sewage disposal and seems to promise the very best of results. Here again is the combination of filtration and irrigation. Vassar College, at Poughkeepsie, N. Y., has recently adopted the purification by irrigation and filtration with remarkable success.

To give the reader an idea of how complete the purification of the sewage is by this combined irrigation and filtration method, the writer describes the following occurrence during a visit to the South Framingham, Mass., plant in July, 1896, and while being shown around by the man in charge, all of the party, three in number, drank the water from the effluent underdrains. The water in no way indicated its origin by temperature or smell, although, it did taste quite soft. It might easily be mistaken for spring water as it came out of the pipe into the ditch, clear and sparkling. The principal crop on these sewage beds was corn, which was growing most luxuriantly.

SEDIMENTATION

In Amherst, Mass., the sewage is collected in a stone tank 15x20x6 feet, divided into two equal compartments, in which the sewage is allowed to settle. This division into two compartments enables one to be cleaned of its sludge while the other may be receiving the sewage. The sludge is

¹ Sewage Purification in America. M. N. Baker, p. 49.

removed once a week. The effluent through a pipe to a river some 500 feet distant. No further purification of the sewage is attempted. This method is obviously incomplete and should be used only as a preliminary step to irrigation, filtration, or precipitation.

SUB-SURFACE DISPOSAL

Lenox, Mass., was the first American town to attempt the purification of its sewage, and as Mr. Baker says, there are "hundreds of towns in the United States larger than the Lenox of today (3,120 in 1890) still without sewerage systems, although they have had public water supplies and leaching cesspools for many years." Col. Geo. E. Waring, now in charge of the New York Street Cleaning Department, was the engineer for this system, and his description is as follows: *

The plan finally adopted and carried out consists of several miles of six-inch pipe sewers, connected at their upper end, for flushing and for ventilation with the rainwater leaders of such adjacent buildings as were available. The various lateral sewers, four or five in number, were connected with a single six-inch main sewer leading for a distance of about 2,500 feet to the upper edge of a field somewhat isolated with reference to present or probable building. It here discharges into a flush tank having a capacity of about 500 cubic feet, separated into two chambers by a wire-cloth strainer to hold back obstructing material. This tank is discharged by a Rogers Field's siphon into a smaller chamber having two alternative outlets, one leading to a system of sub-surface irrigation pipes aggregating 10,000 feet in length, and the other to a surface carrier for the disposal of the outflow over the ground should a portion of the tiles become obstructed. The main sewer leading to the tank has also a branch outlet by which the direct flow may in case of need be turned on to the ground.

This was the old system constructed in 1875-6, and after several years' use, the sub-surface pipes became clogged, and the sewage was then discharged entirely upon the surface. A new system was introduced in 1888, consisting of a settling tank and large stone drains for sub-surface disposal. The liquid from the top of the tank is drawn off through a pipe line, which connects with six brick manholes, or wells. The sewage passes through the bottom of the manhole into stone drains formed by digging trenches and then filling them with stone. These drains are about two feet wide at the bottom, four feet at the top, and four feet deep. Near the top of the drain an Akron pipe is laid with the bell joints on the down grade end, and through these joints the sewage escapes to the drain. They are covered with earth and extend for some three or four hundred feet across the field into a wooded area where they end abruptly. There are six of these drains in use. At the tank there is a slight odor, but usually none at the outlet of the effluent into the river. At intervals of eight to twenty-one days the sludge is drawn from the bottom of the settling tank into a large earth pit, from which it is removed to a compost heap.

MECHANICAL SEPARATION BY FILTRATION

Atlantic City, N. J., possesses a system of sewage purification which consists of an elevated filter bed, in which sand, with hay below, is used as the filtering material. This filter is supported by a wooden structure, and as the effluent comes through the filter it is allowed to fall some three feet to gathering gutters which lead to the effluent pipe. Thus the filtration is supplemented by aeration, and it is claimed that much greater purification is

*Sewage and Land Drainage. Geo. E. Waring, Jr.

thus secured. But the rate of filtration is so rapid that they only get a partial mechanical filtration. Mr. Baker visited these filter beds in October, 1892, and found that*—

The creek at the point of discharge of the effluent showed scarcely any sign of pollution, there being only a slight deposit of fine matter on the bank of the creek which appeared to have come from the bed. Many small fish were observed in the water at the mouth of the effluent pipe. * * * A slight musty odor was noticeable at and about the beds, but appeared to come from the sewage-soaked wood rather than from the sewage itself. At a distance of 400 or 500 feet from the beds, facing a strong breeze from that direction, a slight odor, not especially unpleasant, was noticed. The effluent beneath the beds was found to be cloudy, which, with the presence of the fish at the mouth of the effluent pipe, as though securing food there, appeared to indicate that appreciable quantities of solid matter passed through the beds. But notwithstanding the color of the effluent and the presence of the fish, the creek showed but very slight pollution.

Some features of the above system have been patented, and the whole system, known as the "West System," is controlled by the National Sewerage and Sewage Utilization Company, of New York.

Leadville, Colo., has a system for removing the coarse, solid matter of its sewage. A body of sand and gravel, 24 feet square and 6 or 7 feet deep, divided into two sections, which alternately receive the sewage for four or five days. The effluent is discharged into an already polluted stream.

CHEMICAL PRECIPITATION

If certain chemicals are added to fresh sewage a flocculent precipitate will be formed, which settles to the bottom of the tank or basin, carrying with it a large part of the impurities. The clearer liquid remaining above may be drawn off as a comparatively harmless and inoffensive material. The whole process of the chemical treatment of sewage, as described by Rafter and Baker¹, comprises the following: The addition of chemicals, together with the working of the various appliances for grinding and mixing the same, the decanting of the effluent and the caring for the sludge; the complete process being in reality partly chemical and partly mechanical.

The same authorities classify the various ways of chemical treatment into the following groups:²

1. Intermittent treatment in shallow tanks, from five to eight feet deep, in which, after the addition and incorporation of the chemicals, the sewage is allowed to remain undisturbed until the completion of the process.

2. Continuous treatment in a series of tanks through which, after the addition and incorporation of the reagents, the sewage is allowed to flow slowly; crude sewage with freshly added chemicals passing in at one end, and purified effluent passing out at the other.

3. Vertical tanks, through which, after the addition of the chemicals, the sewage rises slowly.

There are a number of variations of these three systems, but none of them are important enough to justify further subdivision into classes.

The conditions necessary for success from chemical treatment they³ further state are:

1. That the sewage be treated while fresh.
2. That the chemicals be added to the flowing sewage and thoroughly mixed with it before it passes into the settling tanks.

* Sewage Purification in America. Baker, p. 127.

1 Sewage Disposal in the United States. Rafter and Baker p. 203.

2 Sewage Disposal in the United States. Rafter and Baker, p. 25.

3 Rafter and Baker, p. 234.

3. That there be a liberal amount of tank space.

4. That the arrangements for removing the sludge be such as to insure its frequent removal, for if left in the tanks until putrefaction sets in, the sludge is likely to rise to the surface, giving off foul odors.

The sludge resulting from this process may be either burned or utilized in various ways as fertilizing material.

The chemicals most commonly used as precipitants are lime, sulphate of alumina, and ferrous sulphate. These chemicals combine with the carbon dioxide or with a portion of the organic substances in solution, and thus form an insoluble precipitate that will sink to the bottom.

For several years this process has been studied with a view of finding out the best and cheapest precipitants to use. Mr. Allen Hazen carried on a valuable series of experiments in this line, in 1889, at the Lawrence (Mass.) experiment station, and he concludes, among other things, that—

By reason of (a) variations in the composition of the sewage at different places and (b) changes in prices of the reagents, it is impossible to say that one treatment is universally better than another.

By the use of a proper amount of either an iron or an aluminum salt, from one-half to two-thirds of the organic matter of sewage may be removed by chemical precipitation. With the process carried out in detail, the effluent can be discharged into a running stream without producing a nuisance. The incompleteness of the purification in comparison with the cost of the process will be likely to confine the application of chemical purification to narrow limits. There is nothing in these experiments to indicate that the effluents from chemical treatment are fit to drink.

It will be remembered by those who visited the Chicago Exposition in 1893 that the sewage from the fair grounds was treated chemically. The works¹ consisted of four cylindrical iron settling tanks of the Rochner-Rothe type, 32 feet high and 32 feet in diameter, with conical bottoms, which, in a height of 22 feet, tapered from 32 feet to 6 feet. The total height was thus 54 feet, and the capacity of each tank as ordinarily used, with sewage standing 18 inches below the top, was 237,000 gallons. The chemicals employed were crude ferrous sulphate, crude sulphate of alumina, ferric sulphate, and lime. During a period of twenty weeks, the analyses show that substantially one-half of the total organic matters was removed by the precipitation.

This sewage plant at the World's Fair held back from Lake Michigan 1,300 tons of sludge resulting from the treated sewage, which contained about 250 tons of actual organic matters. Mr. Hazen² further concludes in his report that—

They (the sewage works) prevented the sewage from making a nuisance along the lake front such as often resulted from one of the city's sewers discharging untreated sewage just north of the grounds, and they reduced the danger of infection of the water drawn from the Hyde Park intake and supplied to the fair grounds and to the southern part of the city of Chicago.

As an object lesson to thousands of visitors, they have given new ideas as to the possibility and necessity of sewage treatment and as to modern methods of securing the cleanliness of the waters on which many cities and towns are located.

The sewage of the city of Worcester, Mass., has been treated by chemical precipitation since June 25, 1890,³ the effluent being discharged into the

¹ Massachusetts State Board of Health Report, 1893. p. 597

² Massachusetts State Board of Health Report, 1893. p. 612

³ Massachusetts State Board of Health Report, 1893. p. 343.

Blackstone River, which had previously been complained of by the towns below as a nuisance.

CONCLUSIONS

Wherever the old system of cesspools has been replaced by a public sewerage system, in that town or city has the death rate been lowered. Notwithstanding this well-known fact, municipalities are always slow to introduce a sewerage system. It has also been known for some years that the sewage could be disposed of in an inoffensive manner, but still, with the most unsanitary conditions surrounding them, people are slow to act, and by this negligence unwittingly cause many deaths and much sickness.

The foregoing descriptions and examples of the more modern sewage disposal plants will serve to show that in almost any locality in this country, the sewage can be successfully treated, either by the adoption of some one system, or a combination of two or more. In no case is the undertaking a good thing as regards the money return, but in nearly all cases the results are most satisfactory from a sanitary standpoint.

It will be noticed in the preceding pages that no attention has been paid to the various methods of removing nightsoil from individual dwellings, other than by water carriage into a general sewerage system, but as we have been dealing with municipal sewage disposal, the other problem would hardly be properly included.

Furthermore, it has been the object to emphasize, not so much the removal or disposal of the sewage, as its purification. The former is the engineering question and the latter the sanitary one. Unfortunately, the data in regard to the results of the different sewage disposal plants are very meagre, for in many cases, the city, having spent the money to introduce the system, does not care to lay out any money on analyses to see how the work is being done.

The towns in Indiana are growing up rapidly, and will be obliged to meet this question some day in the near future. Indianapolis will be one of the first to grapple with the problem, although many smaller cities need to do so fully as much as the capital. Many, if not all, of the streams in the State are polluted, and many serve as water supplies. Knowing these facts, we have published this Bulletin to inform the people throughout the State what has been and is being done with this all important question.

XX

SCHOOL GARDENING

The State Superintendent of Public Schools has annually been trying to stimulate in the minds of the teachers and children of Iowa, by the programs prepared for Arbor Days, a love for nature—for flowers, and trees, and birds. The object is a most commendable one. There is no better way to instil a healthy and reverential morality in the minds of children than by teaching them to "look through nature up to nature's God." Æsthetic tastes and practices, like cleanliness, are next to godliness.

In the last Biennial Report of this Board, the SECRETARY reprinted a circular issued by Cornell University on "Rural School Grounds," which received quite a good deal of attention, and was heartily endorsed by State Superintendent Barrett. The SECRETARY herewith reprints another circular giving an interesting picture of German school life, and some practical suggestions that may prove interesting to all classes of our people. If such methods can be woven into the curriculum of our Common School life it would surely conduce to healthfulness as well as much greater usefulness.

Would it not be possible even in our urban schools—High Schools—to combine gardening with other industrial departments?

Chicago has been doing this for two years with much satisfaction. The School Board rents acreage, and the ground is platted and staked off, and a certain area given to each student—the whole supervision being under a skilled gardener. The students generally go on Saturday—the street cars carrying them free.

In the circular reproduced below a very thorough practical course of study is detailed, which if incorporated into the curriculum of our Iowa schools could not help but be beneficial, even though it might displace some of the so-called "accomplishments." The following is the circular alluded to:

A GERMAN COMMON SCHOOL WITH A GARDEN*

Most of the common schools in the smaller villages of Germany have attached to them a small garden. This garden is intended primarily for the use of the teacher of the school. It serves his table with a few fresh vegetables and fruits in their season and thus indirectly adds a mite to his modest salary. In most instances this garden is used solely as a source of income and pleasure to the teacher. Occasionally, however, some especially active and wide-awake teacher sees in the garden a means of instruction. Here plants can be watched in their development from seed to flower and fruitage; the curled leaves on a choice plant may show where an insect has made its home; a heavily laden apple-tree may suggest the value of pruning; a few



FIG. 1.—Alfter common school The school building on the left, the principal's residence on the right.

pansies or a rosebush rightly placed may awaken ideas of beauty. And so the garden becomes a field for observation. The teacher's nature study charts are supplemented with real flowers and fruits grown in his own garden and with insects, birds, bees, and low forms of life that make their homes in his own hedgerow or feed upon his choicest plants. Pupils working among these flowers, pruning trees, or gathering berries from vines planted and tilled by themselves, may acquire an interest in nature and husbandry which will remain with them throughout their after life. Certainly they will acquire a practical knowledge of the ways in which fruits, flowers, and garden veg-

* U. S. Department of Agriculture. Circular No. 42. C. B. Smith. Experiment Stations. Reprint and cuts kindly furnished by the Department.

etables are planted and cared for, which will be of value to them in their future work as farmers or the owners of homes and gardens.

A school of this sort, located at Alfter, a village of some 2,000 inhabitants, in the German Rhine Province, between Bonn and Cologne, was visited by the author in 1899 (see figs. 1 and 2). The whole region lying round about the village is intensively farmed and forms practically one vast garden. Vegetables alternate with orchards with occasional strips of grain or forage plants. The school is what is known as a "people's school." This is the common school of Germany. Only the fundamental branches are taught in these schools, and the whole course is completed in eight years.

The Alfter common school contains 400 pupils and six teachers. In this school, as in all others in this province, two hours' instruction weekly in



FIG. 2.—Alfter common school. Pupils pruning trees and doing other work in the school garden under the direction of the principal.

fruit culture, gardening, and general farming during the last two years of the course is required. This has been compulsory by law since 1895. Outline suggestions for this work are sent the principal of the school by the provincial government, as follows:

OUTLINE OF AGRICULTURAL COURSE IN THE HIGHER GRADES OF RURAL SCHOOLS IN THE GERMAN RHINE PROVINCE

FIRST YEAR

April and May.—(1) Inner structure of plants; plant cells and tissues and their functions. (2) Outer divisions of plants: (a) The roots—their function in the nourishment of plants by the absorption of mineral matter, as phosphorus, potassium, sodium, iron, chlorin, and water; (b) the trunk—its branches and buds, the structure of the cambium, and the occurrence of ring growths.

June.—(1) The leaf; the nature and function of chlorophyll in the life of the plant and the effect of light on chlorophyll development; breathing of plants; nourishment of plants from atmospheric constituents—carbon, nitrogen, oxygen. (2) The blossom and its fertilization. (3) The fruit; seeds; reproduction of plants by seeds and by division of members.

July.—(1) The soil and its improvement—lime soil, clay soil, loams, sand. (2) The using up of plant food and its replacement by barnyard manure, compost, wood ashes, and indirect manures, as lime and gypsum. (3) Influence of the climate on plants.

August.—(A) Fruit culture. (1) Planting and nursery management of seedlings. (2) The most important methods of fruit improvement—root and stem grafting and budding with active and dormant buds. (3) Management of improved seedlings in the nursery—formation of the trunk and top; transplanting; handling of trained trees, especially espalier forms, with reference to their training against schoolhouse walls. (4) Culture of small fruits—gooseberries, currants, raspberries, strawberries and blackberries; setting grapevines and their afterculture.

September.—(B) Fruit utilization. (1) Ripening of the fruit; gathering, sorting, and storing winter fruits. (2) Fruit varieties—selection of the more commendable sorts with regard to their suitability to different climates and soils and at varying altitudes. (3) Drying fruits; preserving; making fruit sirups; wine making. This work is planned especially for the girls.

October and November.—(C) Fruit-tree management. (1) Planting trees; pruning the roots and branches; watering newly-set trees and tying to stakes. (2) Care during the first year; top pruning. (3) Management of old trees—rejuvenating by pruning, grafting, and scraping the bark. (4) Diseases of fruit trees and their prevention—knot growths, blights, gum excrescences, and frost injuries.

December.—Enemies of fruit trees in the vegetable kingdom—misletoe, mildew, lichens, and moss. (2) Animal enemies of fruit trees—rabbit, mole, marmot.

January.—June bug; plum, apple, and pear curculios; wasps; white butterfly; woolly aphid; and winter cankerworm.

February.—Minerals: Soft coal; stone coal; petroleum; clay and its application in the manufacture of pottery and bricks; table salt.

March.—Iron, lead, copper, nickel, gold, silver; German coins.

SECOND YEAR

April and May.—(1) Garden work—laying out plats, spading, manuring, sowing, seed, watering plants, hoeing. (2) Vegetables—white and red cabbage, savoy cabbage, lettuce, spinach, carrots, and onions.

June.—(1) Legumes—beans, peas. (2) Asparagus, cucumbers. (3) Utilization of vegetables—drying, pickling, making into kraut, and preserving. (4) Field work—plowing, harrowing, rolling.

July.—Field crops: Cereals—rye, wheat, oats. (2) Potatoes, beets. (3) Fodder crops—clover, grasses.

August.—(1) Necessity of crop rotation and consequent methods of manuring. (2) Weeds in garden and field and their eradication. (3) Animal enemies of plants and their control—field mice, phylloxera, asparagus fly, ground flea.

September.—(1) Cabbage butterfly, gooseberry measuring worm, pea weevil, army worm. (2) Useful insects: Bees, ichneumon fly; useful mammals—mole, badgerhog.

October and November.—Plant enemies among the birds—swallow, nightingale, lark, robin, owls.

December.—Domestic animals—dogs, cattle, horses, chickens, doves.

January, February, and March.—Physiology of man.

While this work is laid out for only two years, it practically requires three years for its completion. The plan is intended simply to be suggestive, and it is expected that the teacher will exercise his individual judgment as to time and method of presenting the different subjects, and that he will make his instruction along these lines conform to the agricultural needs of the district in which the school is located. Thus at Alfter nearly every possessor or renter of a small piece of ground is an experienced gardener. He understands thoroughly the value of cultivation and the money worth of every pound of compost. His wife and children work in the field with him. The children at an early age have a very clear understanding of garden operations.

In the matter of fruit culture, however, the community is not so far advanced. The principal of this school is at present, therefore, giving especial attention to this branch of horticultural work, and for this purpose has planted his garden largely to various fruits. The whole garden contains about one-half acre. Dwarf fruits or flowers border the paths about the garden. A nursery grown from seeds planted by the pupils and afterwards grafted or budded and pruned by them occupies a prominent place. Currants, gooseberries, raspberries, and other small fruits and flowering shrubs, annual and biennial flowers, and some vegetables planted in an orderly manner, serve to utilize every foot of available space. A few hives of bees are located on one side of the garden.

The whole work of spading the soil, planting, seeding, cultivating, pruning, and harvesting the crop in this garden, is done entirely by the boys of the sixth, seventh, and eighth grades under the direction of the principal who always works with them. Two hours a week is given to this work during the growing season, and at such times as the conditions of the garden may require. About twenty boys work in the garden at one time, while the remainder of the pupils of the principal's room are having exercises in gymnastics. At the time of a visit to this school a part of the pupils were sowing seed, others were covering them with soil to the required depth, while still others were laying out paths, picking off the dead leaves from flower stems, replanting beds, watering seeds already sown, etc. A few days later the fruits required attention; wall, espalier, and dwarf fruits require to be summer pruned, the fruits to be thinned, insects to be gathered and destroyed.

The children use the pruning shears and do the actual pruning, each pupil being given an opportunity to trim some portion of a tree; but no twig was allowed to be pruned until it was perfectly clear that that particular twig required pruning and indeed to be pruned in a particular place which the pupil himself first determined upon. The necessary tools for this work are furnished by the school. Whenever there is a deficiency it is made up from the principal's own stock or the children bring them from home. When it comes time for budding each pupil buds trees in the nursery. The fall pruning is always done by the children, and small fruits, vines, and shrubs put in order for the winter by wrapping some with straw, laying others on the earth and covering, and the like.

The garden is intensively farmed and made a source of revenue. The same soil is utilized for two or three crops during the growing season and the produce sold. This gives the pupils an opportunity to learn what crops best form a succession with each other during the season and also gives them practice in a limited way in preparing and putting up fruits, flowers, and vegetables for the market.

The principal purposes to walk through the garden each morning before school. Should he discover a harmful insect or disease, a specimen is immediately taken to the schoolroom and the nature and work of the injurious agent shown to the pupils and discussed. This enemy is especially hunted for during the following work hour and the children are asked to search the gardens at home for similar insects or diseases. Thus by daily associations with the garden, daily watching for some new development, and daily discussions and explanations, all the phenomena of the garden are

encountered and brought to the attention of the pupils before the year's cycle is at an end.

Occasionally the bees are made the subject of a special lesson in apiculture. One morning a hive swarmed and flew by the school window, alighting on a small tree. The school was taken to observe this phenomenon. The queen was found among the mass of clustering bees and was placed in the hive, the workers were gathered and placed with her, and a new colony was formed. Work in the apiary is incidental but no opportunity is lost to make available anything of an especially instructive nature concerned therewith and in the nature work the history of bees is considered.

So likewise flowering plants in the school windows are incidentally made a means of instruction. The principal's room contains three windows. These are filled with potted plants. The children (boys) are allowed to tend these flowers, to water them, guard them from insects, remove dead leaves and blossoms, and are permitted to have all the cuttings from the plants, either to take home for themselves or to plant in the school garden. The results of this plan are apparent in every garden and window of the village, where flowers are seen growing in the greatest profusion.

The principal is the local vineyard inspector and in this work is required to visit the different vineyards from time to time and make careful search for all injurious agents. He is at the same time a member of the Bonn horticultural association, and this gives him a wider field for observation and keeps him in touch with progress in horticulture. The principal has been a teacher in the village school for thirty-two years and has taught horticulture from the first. During these long years of service he has had an opportunity to observe something of the influence of his horticultural efforts in the school-room and garden on the community at large. In the matter of vegetable gardening, it is difficult to say what has been the influence of the school in securing the present high state of perfection, though through the principal's efforts the larger part of the present standard varieties of vegetables and fruits have been introduced in the village. It is certain, however, that there has been a decidedly beneficial influence exerted in the matter of flower and fruit culture, an influence which the principal thinks directly traceable to the school-room and garden. The children themselves seem to enjoy the garden work. They gather seedlings from the forest, graft or bud them at home, and are soon the possessors of their own fruit trees, and nearly all have little flower gardens or potted plants of their own.

It would be wrong to suppose that all the common schools of the Rhine Province have been equally fortunate in securing such high grade results in agricultural instruction. As a matter of fact, in the great majority of the schools of this province, the instruction in agricultural subjects is almost wholly theoretical. The teachers who make use of the school garden for purposes of instruction are the exception. The majority of teachers in German schools come from the cities and thus have not been in close association with rural life and work. The technique of orchard, garden, and farming operations has never been mastered by them and with only theoretical knowledge of these subjects the difficulty of successfully teaching them is greatly increased. The principal of the Alfter school ascribes whatever success along horticultural lines he has been able to bring to the school almost entirely to the fact that his early academic teacher was a man who thor-

oughly understood and who was thoroughly in love with horticultural work. The tendency is to confine the work too largely to the school-room. Even from this standpoint, however, the course, when illustrated by good charts, prepared specimens, and the use of simple text-books, has considerable educational value. But the Germans are becoming fully aware of the fact that the complete success of such a course will depend almost wholly on the teaching ability, theoretical and practical knowledge of the subject, and enthusiasm of the individual teacher.

XXIII

BEANS, PEAS, AND OTHER LEGUMES AS FOOD*

INTRODUCTION

The word legume is used by botanists to denote the one-celled two-valved seed pod, containing one or more seeds, borne by plants of the botanical order Leguminosæ. The most common representatives of this family which are used as food are the various kinds of beans and peas. In common usage the term is applied to the plants themselves, which are hence called leguminous plants or legumes. The term pulse is also sometimes applied to this class of plants. The papilionaceous or butterfly-shaped flowers and the pendant pods of the pea and bean are familiar in every garden, while the ripened seeds of the pea, bean, lentil, and peanut are among the standard food stuffs offered in our markets. Taking the world over, the legumes are, next to the cereals, the most valuable and the most extensively used among vegetable foods. The seeds are eaten green, either alone or with the pod, as in the case of string or snap beans and edible podded peas, and also in the fully ripened state, as split pea, dried bean, lentil, and peanut. Most species of the pea and bean have been greatly improved by the gardeners' art.

GEOGRAPHICAL DISTRIBUTION

Representatives of the legume family are found in all climates and countries. The pea and bean grow rapidly, three and four months being sufficient to bring most varieties to maturity, and consequently they can be grown in the short summers of far northern lands, the pea, the most hardy of them, at least as far as 67 degrees north latitude; and, as they also stand high temperatures, they are all largely cultivated in tropical and subtropical regions. The pea is the favorite legume of middle and northern Europe, while in the Mediterranean countries the bean is grown more generally than the pea. In nearly all sections of our own country both the pea and the bean are grown extensively, and are even exported. Peanuts of a superior quality are cultivated in our Southern States. So far as can be learned, the lentil is at present grown in this country only to a small extent in the southwestern portion of the United States.

THE BEAN

This valuable legume is known to have been cultivated by the Egyptians, the Greeks, and the Romans. The Romans used the broad bean (*Vicia faba*) in voting and in certain ceremonies. Early voyagers to the Western

*U. S. Department Agriculture, Mary Hinman Abel, Farmers' Bulletin 121. Permission to reprint kindly granted.

Continent speak of beans and peas as being cultivated by the Indians in different parts of North and South America, and we know that the Algonquins had one and perhaps two varieties of pole beans. The Indian name for the

bean means "to wind about." Champlain, in 1604, describes the planting of what he calls the "Brazilian bean" in the region of the Kennebec. He says it grew five to six feet high and wound around the corn. It was certain that before 1600 A. D. beans were cultivated as far north as the St. Lawrence, and they were recognized by travelers as "proper to the country." Bean flour is spoken of as in use among the Aztecs. Beans are now widely distributed, one or more varieties being grown in all temperate, tropical, and subtropical countries.

The main species of beans are briefly discussed below.

BROAD OR WINDSOR BEAN (*Vicia faba*)

This is the "bean of history," or that which was earliest cultivated. This bean (Fig. 1) grows erect about two and one-half feet high, has a square, reddish stem, and the leaves are made up of oval leaflets. The pods are broad, thicker at the end, and generally curved and pendent, containing thickish, bulging seeds. Several varieties are grown in Europe, both for fod-



FIG 1. — Broad or Windsor Bean

der and for human food, but it does not continue as long in bearing as other beans. It is said to be more generally eaten there by the poor than by the wealthy, but, as it has a distinct and agreeable flavor of its own, quite different from the kidney bean, it should be better known among us. It is gathered when full grown, but unripe, and it is then best flavored. The Broad Windsor is perhaps the best known of the cultivated varieties but it is less successfully grown in the United States than in Europe, the climate being apparently unsuited to its best development. It is imported to some extent in exchange for varieties grown here.

KIDNEY BEAN

(Phaseolus vulgaris)

This species, with its numerous varieties, comprises all beans ordinarily used among us except the Lima bean. It is a native of a warm climate, probably of South America, and was introduced into Europe in the sixteenth century. It was not known to the ancients. It has since become very important, chiefly because varieties of it are easily produced by the gardener and the quality thus improved by cultivation. What is called the "keel" in papilionaceous flowers is reduced in the kidney bean to two small blades which do not adhere and cover the pistil, so that cross fertilization with different varieties is easily brought about. It is naturally a climber, but dwarf varieties have been developed which we call bush beans, which are used both as string or snap beans and as dried beans. This bean grows rapidly, flowering and seeding early. It has large, rough leaves, made up of three leaflets, and the butterfly-shaped blossoms, in cluster of from two to eight, start at the axils of the leaves. The pods and seeds are variously shaped and colored. The kidney beans may be divided into two groups—tough podded and edible podded (Fig. 2), there being both bush and pole varieties of each group. A great number of varieties have been developed, each locality having its own favorites, and the tendency of growers to rename standard varieties or those which have developed only unimportant differences tends to confuse the nomenclature. The many "wax" beans belong to this species. Most of the "shell" beans which are eaten before fully ripe are of the pole varieties. The prejudice against beans that grow dark in cooking is unfortunate, since many of them are of fine quality and full flavored.

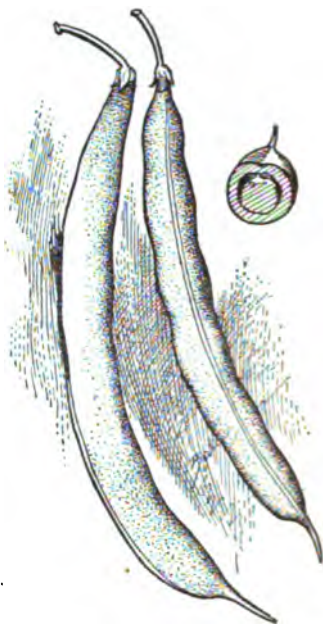


FIG. 2.—Snap or edible podded kidney bean

LIMA BEAN

(Phaseolus lunatus)

This bean is of South American origin, a tall climber, bearing a very flat, broad pod, with short, flat seeds, slightly kidney-shaped, one of the halves nearly always larger than the other and wrinkled or fluted (Fig. 3). The Lima Bean is of excellent quality and a favorite shell bean, both green and ripe, especially in the United States. There is also a cultural variety of bushy habit.

SCARLET RUNNER

(Phaseolus multiflorus)

This species, familiar as an ornamental climber but seldom used as food in the United States, is considerably used for that purpose in Europe, especially in England, some varieties being often preferred both



FIG. 3.—Lima Bean

as string and green shell beans to the kidney bean. They are, however, inferior to other beans when dry. It seems strange that this handsome climber, of vigorous and rapid growth, should be so little known as a food plant. It is used while young and tender in the form of string bean. It bears better if the growing points are pinched off.

FRIJOLE

(*Phaseolus* spp)

Another species which should be noted as being of local rather than general importance is the frijole (*Phaseolus* spp.) of Mexico and our Southwestern Ter-

ritories, a small, flat bean frequently of a reddish brown or light tan color. Various other colors are also found. It is, next to maize, the staple food in those regions. It is largely used also as a green or snap bean. Either green or dry it is an almost daily food with the Mexicans or natives of Spanish-Indian descent.

It would seem that the dry frijole might well be used farther north. Several varieties that have been tried are very good both in soup and as a vegetable.

COWPEA

(*Vigna catjang*)

The cowpea (Fig. 4) belongs to the bean family; but it is the "field pea" of the Southern States. There are several varieties—the "red" and "black" varieties, the round "lady" peas, the large "black-eye" and "purple-eye," and the variously mottled and speckled "whippoorwill" peas, besides many others. There are both trailing and bush varieties. The plant bears a leaf with three leaflets and long pods growing in pairs on a long stem. The cowpea has been grown for at least one hundred and fifty years in our Southern States, the seed having been brought from India or China. It is grown both as a forage plant and for human food, but mainly as a fertilizer for the soil (green manure). Considerable quantities of the cowpea are consumed during the season, being gathered when the pods begin to change color and before they become dry. For winter use the dry peas are cooked like other dried beans and have a very agreeable flavor.

The cowpea requires a longer season than the kidney bean and will seldom, if ever, mature in the climate of New England. But as a dry bean it might well be introduced into our Northern markets on account of its distinctive and agreeable flavor.



FIG. 4—Cowpea

SOY BEAN
(*Glycine hispida*)

“The soy bean (Fig. 5) is an erect annual plant, with branching hairy stems, trifoliate, more or less hairy leaves, rather inconspicuous pale lilac or violet colored flowers, and broad two to five seeded pods covered, like the stem, with stiff reddish hairs. The seeds vary in color from whitish and yellowish to green, brown, and black; and in shape from spherical to elliptical and more or less compressed. Under favorable conditions the plant may reach a height of four feet or more.”¹

This leguminous plant, probably native in China, is the most important legume of China and Japan. Its remarkably high percentage of protein (34 per cent) and fat (17 per cent) attracted the attention of Europeans some twenty-five years ago. Since that time it has been cultivated to some extent, both in Europe and America, chiefly as a forage and soiling crop. In the Orient this bean and the various food products made from it are so largely consumed that it is perhaps the most important food plant next to rice.

¹ U. S. Department Agriculture, Farmers' Bulletin, 58.

The soy bean is eaten to a small extent boiled like other beans, but in China and Japan it is elaborated into a variety of products, all of which have a high percentage of protein, and when eaten in connection with the staple food, rice, which is so deficient in that constituent, helps to make a well-balanced dietary. Some one of these products are eaten at, perhaps, every meal and by rich and poor alike, especially in the interior of these countries, where sea food is not obtainable. One of the most important of these preparations is shoyu, and it is the only one that has been introduced to any extent into other countries, where it is known as soy sauce. To make it, a



FIG. 5.—Soy bean

mixture of the cooked beans with roasted wheat flour and salt is fermented for some years in casks with a special ferment. The result is a thick brown liquid having a pungent and agreeable taste.

There are also several varieties of bean cheese or similar products made from this legume which are very important foods. These are natto, miso, and tofu. Natto is made from soy beans that have been boiled for several hours until very soft, small portions of the still hot mass being then wrapped securely in bundles of straw and placed in a heated, tightly closed cellar for

twenty-four hours. Bacteria, probably from the air or the straw, work in the mass, producing an agreeable change in its taste.

For tofu, the soy bean, after soaking and crushing, is boiled in considerable water and filtered through cloth. To the resulting milky fluid 2 per cent of concentrated sea brine is added, which, probably by virtue of the calcium and magnesium salts present, precipitates the plant casein, which is then pressed into little snow-white tablets. It is made fresh every day. Tofu is sometimes cooked in peanut oil before it is eaten. In natto and miso the action of minute organisms plays an important part. In tofu there is no such action. The composition of a number of these products is as follows:

COMPOSITION OF FOOD PRODUCTS MADE FROM SOY BEANS

Soy-bean food products.	Water.	Protein.	Fat.	Nitrogen free extract.	Fiber.	Ash.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Fresh tofu	89.00	5.00	3.40	2.10	.....	0.50
Natto.....	15.32	41.42	21.65	15.05	1.48	3.08
White miso.....	50.70	5.70	24.40	.....	12.00	6.60
Red miso.....	50.40	10.08	18.77	.....	8.25	12.50
Swiss miso.....	12.53	26.43	13.91	19.54	1.41	26.18
Shoyu.....	63.29	8.31	.....	5.10	.....	19.45
Do.....	67.42	7.37	.....	4.06	.....	17.47

LABLAB BEAN AND OTHER UNCOMMON VARIETIES

(Dolichos lablab)

There are several kinds of beans which, though articles of diet in Oriental countries, are used only to a limited extent in the United States, usually by Chinese or other residents of foreign birth or extraction. Lablab beans (*Dolichos lablab*); asparagus bean (*Dolichos sesquipedalis*), and mungo bean (*Phaseolus mungo*), may be mentioned. The green pods of the asparagus bean (fig. 6) are largely used as a snap bean. The pods are long, containing 10 to 16 seeds, more slender than string beans and slightly ridged along the middle of the two valves. Under the name of "tou kok" this vegetable is cultivated by the Chinese in some regions of California and is said to be finding favor with the white residents and is considered a valuable variety of snap bean.

LOCUST BEAN

(Ceratonia siliqua)

There is still another bean which may be said to be among our local food products since the pod is regularly found in a dried state on the confectioner's stands and sold under the name of St. John's bread. It is the carob or locust bean (*Ceratonia siliqua*), grown on the shores of the Mediterranean Sea as food for cattle. It is also eaten to considerable extent by the poorer people. The ripe seeds are surrounded by a sweet mucilaginous pulp of agreeable flavor. When dried the sugar content is as high as fifty per cent. Similarly, portions of the pods of the so-called honey locust (*Gleditsia triacanthos*) are also eaten to a limited extent in this country.

THE PEA

The pea was originally from a more northern clime than was the bean, and it has probably been cultivated from very early times, although it does

not seem to have been known to the Greeks and Romans. It appeared in Europe in the Middle Ages, but it was not cultivated in England even in the time of Elizabeth. Fuller says that peas were brought from Holland and were accounted "fit dainties for ladies, they came so far and cost so dear." From the market gardener's point of view, the pea is the most important of the legumes. In this country and in Europe great quantities are consumed in the green or unripe state, and in Europe the dried or "split" pea is as largely used as the dry bean; with us it is less popular.

FIELD PEA
(*Pisum arvense*)

The field pea has few varieties. It has in general colored blossoms and the seeds are more or less spotted with brown. The field pea is chiefly used

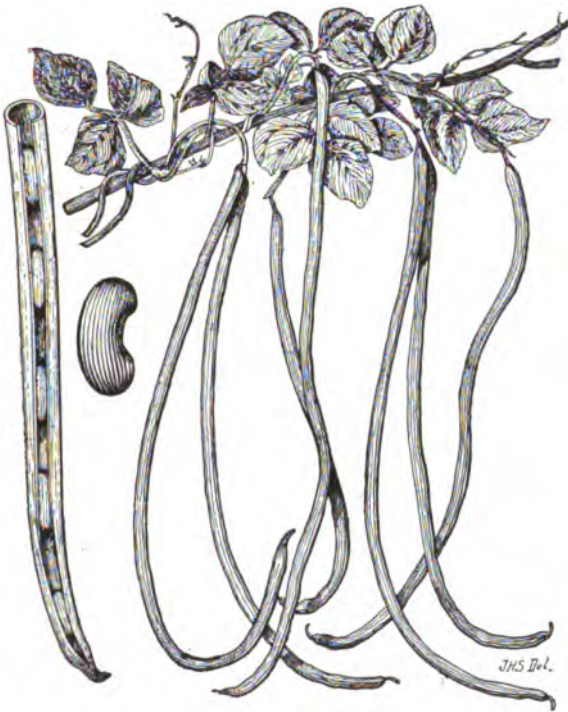


FIG. 6.—Asparagus bean

for fodder; but one variety, the Canadian field pea, is considerably used as a table vegetable. When two-thirds grown it is said to be delicate and well flavored, and it has the advantage of a longer season than the garden pea. As a dry pea it is inferior, as it does not cook soft.

GARDEN PEA
(*Pisum sativum*)

The garden pea (Fig. 7) has many varieties, but they are kept only by great care, as they easily revert to the original type. The culti-

vated pea has slender, hollow stems bearing compound leaves and terminating in tendrils which attach to any near object. The flowers, generally white, are produced in the axils of the leaves and are followed by pods containing a number of green seeds which are light green when unripe and green or white when ripe.

The garden pea is divided into tough podded or shelling peas, the only kind in general use in this country, and the edible podded or sugar peas. Both kinds may be tall, dwarf, and half dwarf.

Shelling peas are again divided into the smooth or round seeded and the wrinkled kinds. Many varieties of both have been developed by the gardener. There is indeed a useless multiplication of names and varieties.

The edible podded peas (Fig. 8) deserve to be better known among us. Many varieties are successfully cultivated in Europe, but here as yet they are grown chiefly by amateurs and are hardly in the market. The seed is furnished, however, by most growers. This pea has a very tender pod, the ordinary parchment-like lining being much attenuated. The pod is thicker and more fleshy than the pod of the shelling pea. It is gathered when the pea is just forming and used, pod and all, exactly like string beans. Some varieties tested were found to be excellent in flavor and texture.

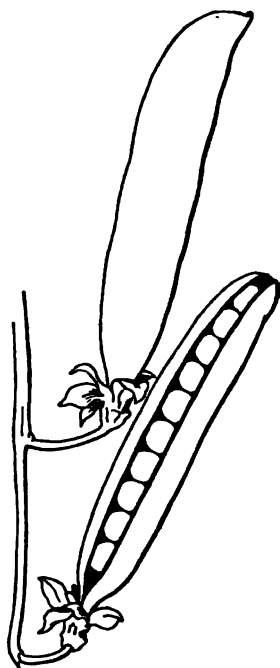


FIG. 7.—Garden pea

CHICK-PEA OR GRAM

(*Cicer arietinum*)

A shelling pea, practically unknown here, is the chick-pea (*Cicer arietinum*); the garbanzos of Spanish cookery, or the gram of India. It is largely cultivated in southern Europe, in Spanish America, and many parts of the East, especially British India, whence it is exported. It is a stiff, upright plant, covered with hairs and bearing inflated pods containing a few curiously shaped seeds; the two lobes distinctly marked and the germinal point very prominent.

These peas are eaten boiled, but more commonly roasted. This roasted pea seems to have been much in use in Roman times, the phrase *fricti ciceris emplor*, "buyer of roasted chick peas," meaning in conversation a poor fellow.

THE LENTIL

(*Lens esculenta*)

The lentil (Fig. 9) is a small branching plant with delicate pea-like leaves. The small white flowers growing in pairs are followed by flat pods, each containing two very flat round seeds, convex on both sides. Unlike the pea

and bean, the lentil is eaten only when fully ripe. The brown or reddish lentil is smaller than the yellow, but of more delicate flavor.

The lentil is one of the most ancient of food plants, probably one of the first to be brought under cultivation by man. It has been grown from early times in Asia and in the Mediterranean countries. The reddish Egyptian lentil probably furnished the "red pottage" of Esau. In Europe this legume is far less grown than the pea and bean, partly because of its yield of seed

and straw is less; therefore the market is partially supplied from Egypt. The lentil, according to analysis, is one of the most nutritious of all the legumes, but its flavor is pronounced and to some persons not as agreeable as that of the pea and bean. It has sometimes been claimed that indigestion and other bad effects followed the eating of lentils, but this impression is known in some cases to be traceable to the use of certain poisonous vetches, whose seed much resembles the lentil. There is every reason to consider the lentil a wholesome food. Until recent years the lentil was little known in the United States, but with the growth of the foreign population its use has steadily increased. The lentils found in our markets are all imported, but the culture of this legume with European seeds is being tried in our Southwestern Territories and elsewhere. There is already grown in New Mexico and Arizona,



Fig. 8.—Edible podded or sugar pea

as well as in Mexico, a small variety of lentil, the seed of which was doubtless brought from Spain centuries ago by the ancestors of the present mixed race living there. The sandy soil of moderate fertility seems adapted to it; it has become acclimated, is hardy and prolific.

THE PEANUT (*Arachis hypogaea*)

The peanut (Fig. 10) is so different in appearance from the bean and pea and is put to such different uses that it is seldom thought of as a legume,

but a study of the growing plant immediately shows the resemblance. Here we see the same straggling, more or less trailing annual, with characteristic leaves, and the butterfly-shaped blossom, whose ovary develops into a seed pod. The manner of growth from this point is very peculiar; as the flower



FIG. 9—Lentil.

withers the stalk or spike of the ovary rapidly lengthens and pushes into the ground, so that the pod is matured beneath the surface, but if the spike is prevented from doing this it soon withers. Other names for this plant are the earthnut, ground nut, ground pea, goober, and pindar. Where the peanut originally grew is uncertain. It is now widely distributed in tropical and subtropical countries, Africa and our own Southern States producing most of the crop.

NUTRITIVE VALUE OF THE LEGUMES

The different kinds of legumes are so similar in their general character, nutritive constituents, and digestibility that in these regards they may be treated together. Even in an immature state, as green peas and beans,

they are, as regards composition, equal or superior in nutritive value to other green vegetables, and the ripened seed shows by analysis a very remarkable contrast to most of the matured vegetable foods, as the potato and other tubers, and even to the best cereals, as wheat. This superiority



FIG. 10 —Peanut.

lies in the large amount of nitrogen in the form of protein that they contain. Another characteristic of the legumes brought out by analysis is the large percentage of mineral matter in them, the excess being chiefly in lime and potassium salts. In some instances they contain a large amount of fat; for instance, seventeen per cent in the soy bean and fifty per cent in the peanut.

A comparison of some of the more common fresh and dried legumes with other food materials is shown in the following table:

COMPOSITION OF FRESH AND DRIED LEGUMES COMPARED WITH THAT OF OTHER FOODS

MATERIAL.	WATER.	PROTEIN.	FAT.	CARBO- HYDRATES	ASH.	FUEL VALUE PER POUND.
Fresh legumes	Per cent	Per cent	Per cent	Per cent	Per cent	Calories.
String beans.....	89.2	2.3	0.3	7.4	0.8	195
Whole pods of <i>Dolichos</i> <i>sesquipedalis</i>	79.9	4.5	.5	13.9	1.2	365
Sugar peas or string peas...	81.8	3.4	.4	13.7	.7	335
Shelled kidney beans.....	58.9	9.4	.6	29.1	2.0	740
Shelled Lima beans.....	68.5	7.1	.7	22.0	1.7	570
Shelled peas.....	74.6	7.0	.5	16.9	1.0	465
Shelled cowpeas.....	65.9	9.4	.6	22.7	1.4	620
Canned string beans.....	93.7	1.1	.1	3.8	1.3	95
Canned Lima beans.....	79.5	4.0	.3	14.6	1.6	360
Canned kidney beans.....	72.7	7.0	.2	18.5	1.6	480

COMPOSITION OF FRESH AND DRIED LEGUMES—CONTINUED.

MATERIAL.	WATER.	PROTEIN.	FAT.	CARBO- HYDRATES.	ASH.	FUEL VALUE PER POUND.
	Per cent	Per cent	Per cent	Per cent	Per cent	Calories.
Canned peas	85.3	3.6	.2	9.8	1.1	255
Canned baked beans	68.9	6.9	2.5	19.6	2.1	600
Peanut butter	2.1	29.3	46.5	17.1	5.0	2,325
Dried legumes:						
Lima beans	10.4	18.1	1.5	65.9	4.1	1,605
Navy beans	12.6	22.5	1.8	59.6	3.5	1,605
Frijoles	7.5	21.9	1.3	65.1	4.2	1,695
Lentils	8.4	25.7	1.0	59.2	5.7	1,620
Dried peas	9.5	24.6	1.0	62.0	2.9	1,655
Cowpeas	13.0	21.4	1.4	60.8	3.4	1,560
Soy beans	10.8	34.0	16.8	33.7	4.7	1,970
Chick-pea α	14.8	12.4	6.7	63.3	2.8	1,690
Peanuts	9.2	25.8	38.6	24.4	2.0	2,560
St. Johns bread (carob bean.) α	15.0	5.9	1.3	75.3	2.5	1,565
Potatoes	78.3	2.2	.1	18.4	1.0	395
Cabbage	91.5	1.6	.3	5.6	1.0	145
Tomatoes	94.3	.9	.4	3.9	.5	105
Rolled oats	7.7	16.7	7.3	66.2	2.1	1,850
Wheat breakfast foods	9.6	12.1	1.8	75.2	1.3	1,700
Spring-wheat flour	12.3	11.7	1.1	74.5	.4	1,650
Winter-wheat flour	11.9	10.7	1.0	75.8	.6	1,650
Lean beef	70.0	21.3	7.9	.....	1.1	730
Dried beef	54.3	30.0	6.5	.....	9.1	840
Milk	87.0	3.3	4.4	5.0	.7	385
Cheese	34.2	25.9	33.7	2.4	3.8	1,950
Eggs	73.7	14.8	10.5	.....	1.0	720

 α European analysis.

Fresh string beans, sugar peas, and shelled peas, like other fresh, succulent vegetables, contain considerable water, which, with the materials dissolved in it, forms the plant juice. They somewhat resemble cabbage in percentage composition. Fresh shelled beans, peas, and cowpeas contain a fairly large amount of protein or nitrogenous material, the nutrient which serves to build and repair body tissue as well as to furnish energy. They also contain considerable carbohydrates and small amounts of fat, both these classes of nutrients serving to supply the body with energy. The amount of ash or mineral matter in the legumes varies in amount. It doubtless serves the same purpose in the body as mineral matter found in other food materials. The canned legumes, which are simply cooked foods sterilized and kept in such a way that they can not ferment, resemble in composition the same materials uncooked. The dried legumes contain some water, though to the eye they seem to be perfectly dry. They contain a high percentage of protein, in this respect surpassing the other seeds commonly used as food, such as wheat. They approach animal foods as regards protein and total nutritive value, most of the legumes containing carbohydrates in place of the fat found in animal foods. Fats and carbohydrates, however, serve the same purpose in the body, although the fats yield two and one-fourth times as much energy per pound as carbohydrates.

NITROGENOUS CONSTITUENTS

Vegetable foods are nearly all rich in starch and other carbohydrates, which supply an abundance of carbon to the system; but they contain, in general, comparatively little nitrogen, an element that is of first importance in a dietary. Therefore, the very large percentage of this constituent found

in the legumes constitute for us their special interest, and the true nature of the compounds in which this nitrogen exists is also of the utmost importance.

Most of the nitrogen found in the pea, bean, and lentil is in a form very useful as food. It was called by Liebig "plant casein," on account of its general resemblance to the casein of milk. Although its action as a food is similar to the nitrogenous matter of other vegetables, it is markedly different in some of its characteristics from, for instance, the gluten of grains. Pea and bean flour will not form a dough with water and can not be utilized for making porous bread.

DIGESTIBILITY OF THE BRAN, PEA, AND LENTIL

Judged by the chemical analysis alone, we should give legumes the very highest place among foods, containing, as they do, more protein than the best cuts of meat, and in some cases a large percentage of fat, besides a considerable amount of starch. Pound for pound, they would thus be more valuable than meat or our best cereals. Forty years ago they were announced by Moleschott as "true treasure-houses for the renewing of our blood," being equal in their albumen content "peas to veal, beans to flesh of doves, while lentils left every kind of meat far behind."

Experiments on men and animals soon made it evident, however, that the true value of a food does not depend alone on the contained nutrients, but also on the ease and completeness with which the system utilizes these nutrients, since, to use the old adage, "man lives not by what he eats but by what he digests." Voit pointed out as early as 1869 that vegetable foods in general were less completely digested than animal foods, for three reasons:

(1) As generally prepared and used, the nutrients of vegetable foods are inclosed in cells composed of cellulose or woody fiber, which is more or less hard and greatly interferes with their absorption.

(2) Vegetable food is prone to fermentation in the intestines, thus increasing the peristaltic movements and, if large amounts are eaten, hastening the food onward before there has been sufficient time for the absorption of its contained nutrients.

(3) The cellulose present acts as a local irritant and produces the same effect.

PRACTICAL EXPERIENCE

Practical experience, reaching to ancient times, testifies that beans, peas, and lentils are "hearty food." To quote the physician Galen, "they are harder to digest than other foods and give bad dreams." There is a general opinion that while they are suitable for robust people leading an active, outdoor life, indispensable to the soldier's outfit and to the logging camp, welcomed by the hunter and woodsman, and a necessary part of the food of the hard-working poor, they are, on the other hand, unsuitable for people leading a sedentary life, and are generally to be avoided by the invalid and convalescent. Such persons often complain of distress after eating beans, especially if the skins have not been removed, and of the disagreeable evolution of gas in the intestines, testifying, as it does, to the fermentability of this class of vegetables. These foods are, therefore, called "indigestible," by which is meant in common speech that they give distress or that we are unpleasantly conscious of the digestive process. These symptoms, however, do not in general indicate anything as to the extent to which the contained

nutrients of a food are absorbed or used in the system. When eaten in reasonable amount by persons in health, it is doubtful if they give rise to unpleasant symptoms. That no bad results attend their use is shown by the important place they have held in the diet since early times.

LABORATORY EXPERIMENTS

Hoffman fed a man bread, lentils, and potatoes sufficient for his full nourishment and found that 47 per cent of the contained protein left the system unused. Of meat containing the same amount of protein, only 17.7 per cent was unabsorbed by the same person.

Woroschiloff, in comparing the digestibility of lentils with meat, found that from two to three times as much of the protein of the meat was utilized in the system as of the legume.

A very careful study was made by Strumpell of the extent of the digestibility of legumes. According to the results it would seem to depend largely on the form in which they are eaten. When he ate 250 grams (about three-fifths of a pound) of beans cooked, as they ordinarily are, whole and without removing the skins, 40 per cent of the contained protein was unabsorbed or four times as much as in the case of meat. On the other hand, when he used "Leguminosenmehl," a prepared food consisting chiefly of lentil flour, only 8.2 per cent of the contained protein was unabsorbed. This equals the average digestibility of meat. As pointed out by other workers, this is, however, not a fair showing, since in order to eat enough of this lentil flour to even partially meet the conditions of the experiment, he was obliged to make it up into cakes with milk, eggs, and butter, and the extent to which the nutrients of the legume were absorbed was, doubtless, much increased by the presence of stimulating animal foods.

Rubner, one of the later observers in this field, found a man who was able to eat for a few days enough cooked dried split peas (about 1½ pounds) to fully nourish him without help from other kinds of food, peas being selected because he liked them better than beans or lentils. Even with this large quantity only 17 per cent of the contained protein was unabsorbed. It may be said that this robust individual does not represent the normal feeder, but the aim in this case is to show a comparison between this and other foods. The same man failed to use in the system 11 per cent of the contained protein of macaroni.

FLATULENCE

It is a matter of common experience that after the eating of legumes in any quantity there occurs what is known as flatulence or the formation of gas in the intestines. This effect is not confined to people of delicate digestion, although it is to them more distressing, nor does it seem to have anything to do with the extent to which the nutrients of the food are used in the system. Experiments with animals indicate that the formation of methane is entirely due to bacterial action on carbohydrates in the intestine. Rubner's man who digested so well the large amount of peas above cited complained very much of this disagreeable accompaniment. In India the mungo bean is highly esteemed and is eaten by the rich and by sick people, but always "with a seasoning of asafetida to prevent flatulence."

DIGESTIBILITY IN MODERATE QUANTITIES

The digestibility of legumes is thought to be largely a question of preparation and amount eaten, as indicated above. Properly prepared and eaten in moderate quantities, peas, beans, and lentils can not be called indigestible in the ordinary sense of the word. The entire removal of the skin by sieving is to be recommended in the case of persons with whom they seem to disagree.

As to the extent of the digestibility of the contained nutrients when eaten with the above restrictions, they are probably as well used as those of other vegetable foods; but less so than the nutrients of meat. It should be remembered that a due amount of nonabsorbable or refuse matter is necessary in the food to insure the healthy action of the intestines, and it would be a great mistake to substitute, as a general thing, highly condensed foods for those containing some cellulose. None but the most hardy people could use the legumes as their sole source of nitrogenous food, since for that purpose, 18 ounces daily of dried peas or beans would be necessary for a laboring man, an amount which could be furnished in not less than 6 pints of thick soup; but this fact has nothing to do with their use in moderate amounts, and there is almost no dietary in which they may not profitably find a place.

DIGESTIBILITY OF PEANUTS

The peanut is remarkable among the legumes for its large proportion of fat (50 per cent) and its resemblance in taste and use to the true nuts. Long as the peanut has been cultivated in the South, it has never to any extent taken the place of a food, but remains a food accessory for occasional use only. No laboratory experiments seem to have been made on human beings as to the extent to which peanuts are digested, but, according to general experience, the peanut eaten in any quantity is indigestible in the sense of bringing on pain and distress. This is probably on account of their rich, concentrated character. It is to be noted that when they are eaten in connection with other food, as bread, the ill effects are less marked.

VEGETABLE PROTEIN COMPARED WITH ANIMAL PROTEIN

It has been well known that vegetable foods without any help from the animal kingdom will sustain men in health and working power, and careful experiments have shown that protein performs essentially the same part in nutrition, whether it be from milk, meat, cereal, or legume. Among other experiments may be mentioned that of Rutger, a Dutch physician and his wife, which lasted ten weeks. Their conclusion was that vegetable food can perfectly well be substituted for animal, provided only that it contain the same amount of nutrients in proper proportions. When living on a purely vegetable diet they relied largely on peas, beans, and lentils, eating them in some form at nearly every meal. From an economic standpoint the average difference in the cost of the two kinds of diet was that less fuel was used to cook the animal foods eaten.

It is not improbable, however, that there are differences between animal and vegetable protein that cannot be tested by any method now at our command, differences which would explain the almost universal preference for some animal food in the diet. From our present knowledge it would seem that the mixed diet made up of both animal and vegetable food is the best and most practicable for the vast majority of people.

EXTENT TO WHICH LEGUMES ARE USED IN DIETARIES

Since, as we have seen, peas, beans, and lentils contain as much protein as meat, and no other vegetable foods can approach them in this regard, we need not be surprised to learn that they are extensively used among all people who, either from necessity or from choice, eat little or no meat. This is but one of many instances of a wise choice of food made long before exact knowledge was able to give the reason for it.

Some food rich in protein will be found in the daily diet of all people. The Mongol eats with his rice, which is largely starch, small quantities of fish, fish eggs, and goose livers, but for his supply of proteid material he relies on his different preparations of bean cheese and on soja sauce made from the soy bean. The Mexican, whose supply of meat is scanty and of a poor quality, uses the native bean or frijole at almost every meal, made into a stew with vegetables and perhaps shreds of sun-dried beef, well spiced with the chili or red pepper. The cooking is said to be done now in the unsightly American tin can (in this case a lard or kerosene can), which has almost supplanted of late years the primitive earthen pot described by travelers. The bean stew or porridge, with the tortilla or cake of pounded corn, makes up the bulk of his food. The puchero or daily stew eaten by the poorer class of Spaniards has lentils for its basis, and with the Bedouins and other Asiatic people the porridge of lentils is in constant use. Church mentions twenty species of legumes, some having many varieties that are raised in India, and there they form not an occasional but a staple food among a people who, both by poverty and by religious scruples, are prevented from eating meat. There is a Hindoo proverb, "Rice is good, but lentils are my life." The Roman proverb, "The poor man grown rich no longer delights in lentils," intimates that though indispensable to the man of slender purse their too familiar flavor was gladly exchanged for the more expensive dish when it could be afforded. The legumes have been called the "meat of the poor." Nitti, an Italian writer, tells us that the Neapolitan bricklayers, restricted by their scanty wages to cheap food, but requiring food that is rich in protein, condemn themselves to a daily diet of kidney beans, a vegetable which is at the same time the cheapest and the richest in protein. With the Hindoo the lentil is reputed to have great staying power, and it is a favorite food among those who are to undertake long journeys. Parched as we parch corn, it is much esteemed in Egypt and Syria for this purpose. Arabs feed their horses ground beans to prepare them for extraordinary exertions.

In early days in the New England States the woodcutter who went out for a day's work in the woods in winter almost always took with him "bean porridge," *i. e.*, beans that had been cooked to the consistency of a thick mush and then frozen in bowls. In each bowl had been placed a string, which served to lift out the contents. By the help of the camp fire the frozen cooked beans were again made into porridge.

In the dietary studies made in connection with the nutrition investigations of the Office of Experiment Stations of the United States Department of Agriculture and the earlier work from which this inquiry developed, calculations were made showing the proportion of total nutrients furnished by a number of the principal classes of foods. Taking the average of some fourteen studies with professional men of varied income and living in different

regions, dried legumes constitute 0.6 per cent of the total food and furnish 2.1 per cent of the total protein of the diet—a small amount when their high food value is considered. Wheat flour furnished 8.4 per cent of the total food and eggs 2.2 per cent, or 17.1 and 4.9 per cent, respectively, of the total protein. Considering the average results of fourteen dietary studies with mechanics' families and ten farmers' families, dried legumes furnished one per cent of the total food material and three to four per cent of the total protein, the proportions furnished by wheat, flour, and eggs being somewhat greater than in the case of the dietaries of professional men. The native inhabitants of the southwestern United States and Mexico are reported to consume large amounts of frijoles and other legumes. The average of four dietary studies of Mexican laborers living in New Mexico shows that these materials furnished 9.4 per cent of the total food and 21.3 per cent of the total protein. In this case eggs furnished only 0.8 per cent of the total food and 1.6 per cent of the total protein, while wheat flour furnished 12.3 per cent and 21 per cent, respectively. In the case of professional men, mechanics, and farmers, the total amount of dry legumes used was small, and in view of the high food value, palatability, and low cost of this class of foods it might have been profitably increased.

PREPARATION OF LEGUMES FOR FOOD

Since legumes are to be counted among our cheapest and most valuable food stuffs, if their contained nutrients can be digested, their choice and preparation is a matter of importance. The legumes are used—

(1) Chiefly for the tender pod, which for this purpose must be gathered when the seed is less than half grown. Such are the string bean and sugar pea.

(2) The nearly grown but unripe seed, as the "shell" bean and pea.

(3) The fully ripened seed, as the dried bean, pea, lentil, and peanut.

(4) The flour or meal made by grinding the fully ripe seed—bean, pea, or lentil, and peanut.

STRING BEANS AND SUGAR PEAS

French beans (*haricots verts*), snap or string beans, are the immature fruit pods of several varieties of the kidney bean, both the dwarf and the climbing. The best have little or no "string," some requiring no preparation for cooking. They must be freshly gathered and so young that the beans are hardly noticeable when they are cooked. After the string, if present, is removed, the pods are cooked, either whole or broken into bits. The German method is to cut them transversely a few times or "whittle" them. This seems to shorten the time of cooking and to allow of better distribution of seasoning. They are then boiled in salted water and drained, or the water may be thrown away after a few moments of boiling, the beans being then stewed in as little water as possible and the seasoning added when they are half done.

When the beans form the main dish of the meal, a piece of fat meat is often cooked and eaten with them. When the bean of most varieties is more than half grown the pod is no longer tender enough to be cooked in this way. String beans that must be cooked from one to two hours are not worthy the name. When young enough and freshly gathered they will cook

tender in twenty to forty minutes. There are a few varieties of which the pod is tender until nearly ripe. Sugar peas are cooked in the same way as string beans. After the pods are full grown they become tough, but furnish a good quality of shelled peas.

Salted beans—String beans are sometimes salted for winter use. They can be kept thus for months, and during the time a bacterium is at work effecting a change somewhat similar to that brought about by the fermentation of sauerkraut. The vegetable fiber is softened and certain flavors developed by the process. Thus preserved they are a favorite winter vegetable among the Germans. Before cooking they are soaked over night to remove the salt. Shredded string beans are also dried or disiccated and are much used by armies and expeditions.

String beans and sugar peas or edible-podded peas, eaten as they are for the pod rather than the seed, fall in much the same class with spinach, cabbage, etc. They contain relatively little nourishment in proportion to their bulk and are valuable chiefly for their agreeable flavor, the salts contained in them, and the healthful variety given to the diet.

SHELL BEANS AND GREEN PEAS

Immature or green peas and beans freed from the pod are a highly valued article of diet in almost all countries. They contain a good proportion of proteid material and starch. The cellulose, so woody in the ripened seed, is still tender and easily cooked and the flavor is excellent. The method of preparation is very simple. They must be freshly gathered and shelled, as they deteriorate rapidly in flavor and each hour that passes after their removal from the vines increases the length of time necessary for their cooking. They should be stewed rather than boiled, the water being reduced to only enough to moisten them, and the seasoning, including a generous quantity of butter, added while the beans or peas are only half cooked. A sprig of mint added to green peas when cooking is liked by some; but it may be said in general that so delicate a flavor as that of green peas should not be covered by any strong or pungent additions. The French have a special dish, *haricots verts panaches*, or "variegated" green beans, which is a mixture of the young shelled bean with string beans.

CANNED BEANS AND PEAS

Beans and peas are canned in large quantities. It would seem that the process might be improved, since much of the tastlessness of canned peas is said to be due to the fact that the water in which the peas are boiled is thrown away in the process of "blanching." Canned beans and peas are simply preserved, cooked foods having, in general, the same composition as those that come freshly cooked to the table.

DRIED PEAS, BEANS, AND LENTILS

Green peas and beans are often to be classed among delicacies, but we have in the ripened seed a standard food for all classes. Like the grains, they have good keeping qualities and can be combined with other materials into a variety of palatable dishes. Only fat is needed to make of beans and peas a complete food in the sense that the combination furnishes the proportion of protein, fat, and carbohydrates required by the accepted dietary standards. Hence the popular combination of beans and peas with fat meat, as pork and beans, bacon and peas, corned beef and beans.

Quality—A well-dried bean is smooth and shining; one poorly dried may be of inferior quality with folds in the skin. The best beans are of uniform size, not too small nor a mixture of different kinds. The larger are in general preferred because they have a smaller proportion of skin, but there are several varieties of small beans that bring a high price because they have a thin skin and fine flavor. Heavy, well-filled beans bring a higher price, the weight of a bushel of different kinds varying by several pounds. The value of the dried legume depends finally on whether it will cook soft, and this is to be determined from a given lot only by putting a sample to the test. The main requirements in the cooking of dried legumes are:

(1) To so soften and disintegrate the cellulose that the nutrients that exist in close connection with it are freed.

(2) To cook the proteid constituent so as to make it digestible and palatable.

(3) To swell and burst the starch grains.

(4) To combine with various flavoring matters, as salt, pepper, fat, herbs, and butter or fat meat so that the result shall be a palatable dish.

Treatment of the skin—The first step in the ordinary household practice is the swelling and softening of the legume by soaking in water a number of hours, usually not less than eight, and the removal of such parts as will not soften by cooking. Some cooks, however, believe it is not necessary to soak the beans. They cover them with hot water and allow them to stand a short time before boiling. The first method is to be preferred.

In the ripened and dried legume, the envelope becomes tough and leathery; even when cooking has done its utmost, these skins and hulls pass through the intestinal tract quite unchanged. The skin of the ripened pea and lentil is easily removed and the "split pea" and the lentil, as generally sold, have this decided advantage over the bean in the making of digestible soup and porridge. Many kinds of beans, however, after proper soaking, may be freed from their skins by stirring in water. The skins rising to the top are then skimmed off. The large Lima beans after soaking may be easily slipped out of the skin by pressing between the fingers. They can then be boiled and served as a vegetable of the consistency of mashed potato—sometimes called bean pudding. Peas pudding cooked in the same way is a familiar dish. In cooking beans for soup the skins may be separated by sieving.

Hard v. soft water for boiling—The water for cooking dried legumes, it is agreed by all writers on the subject, should not be "hard" water, by which we mean that which is impregnated with various salts, as lime and magnesia salts, since the legumin of the seeds forms with these salts insoluble compounds with the result that portions of the vegetable remain hard, no matter how long they are cooked. Rain water is preferable for cooking legumes.

Strumpell in the course of his experiments on the digestibility of legumes compared the use of distilled water with that to which a certain amount of lime salts had been added. Lentils cooked in distilled water took up nearly double their own weight of water and cooked soft in one and one-half hours. Some of the same kind of lentils cooked in the hard water took up only their own weight of water, and after boiling for the same length of time only the skins had swollen and lay in folds over the kernel, which remained entirely hard. Such extreme results would not follow the use of ordinary

hydrant water, as it is less hard than the artificially hardened water in this case, but in proportion as it contains these salts it is unsuitable for the cooking of legumes.

The question then arises, What is to be done when the only water obtainable [for cooking is hard water? In most books on cookery it is advised to add to the water in which peas and beans are cooked a small quantity of baking soda, a teaspoonful to the gallon, since, if the hardness is due to calcium carbonate, the soda will remedy it. Peas and beans cooked in this water are indeed easily softened, but experiment shows that the flavor is apt to be injured. If soda is added to the water it is better to boil and cool it and pour away from the sediment before using. But since the cook has generally no means of knowing the degree of hardness of the water and thus the exact proportion of soda to be added, it is probably better to simply boil the water before using and pour it from the sediment, since boiling alone will precipitate the bulk of the lime or calcium carbonate. When the hardness is due to the presence of the sulphate of lime or magnesia, neither boiling nor the addition of soda will avail. It is often possible to use rain water for cooking legumes, and this naturally distilled water is the very best for the purpose. The soft water should be used both for soaking and cooking.

Flavor—Soaking legumes in fresh water seems also to remove a certain bitter taste, especially noticeable in lentils, and in Eastern countries lentils are sometimes soaked for days for this purpose.

All dry legumes require a long application of heat, not only to soften the cellulose, but to develop the proper flavor; some say as long as twelve hours. The difference of opinion on this seems due to a differing estimate as to what is the desired result. The dried pea or bean that has been soaked overnight in water may be in one and one-half to two hours cooked soft enough to be pressed through a sieve, but the tongue can still detect individual grains. To disintegrate and soften absolutely every particle and to develop the best flavor a much longer time is needed. The dish of pork and beans baked all night in the New England brick oven, the pea soup slowly cooked for twelve hours, as in some of the special ovens which cook food very slowly, are instances of legumes properly prepared. The flavor of dry legumes is thought by many to be improved by the addition of onions and flavoring herbs or meat broth. Perhaps the best, as well as the most common, method of preparing the dried pea and lentil is in a thick soup or puree seasoned with salt, pepper, and butter. Beans are also often cooked in this way, although perhaps more frequently served in the United States as baked beans.

BAKED BEANS, PEAS, AND COWPEAS

After a preliminary boiling, beans, peas, and cowpeas may be baked in an oven, with various additions thought to improve the flavor, as pork, molasses, etc. The small white or navy bean is quite generally used for this purpose, chiefly because its skin is thin and tender, but the mode is well adapted to all varieties of beans. It is generally thought that the fat present in such dishes improves their flavor.

ROASTING

While roasting is almost the only method in use among us in the preparation of the peanut, it is perhaps never applied in the United States to the

other legumes. The pea and the lentil are roasted in the Mediterranean countries and form there a regular article of food. In India peas are parched in hot sand. For a people who possess only primitive cooking appliances, roasting certainly has the advantage over boiling. Just as a quantity of peanuts may be roasted with a handful of charcoal, while at least two hours of stewing are needed to soften them, so the chick-pea, as found by experiment, can be parched over coals in a few moments and thus made edible. The taste reminds one of pop corn and roasted chestnuts. A slight bitterness is present, due, probably to the skin, which does not slip off in roasting, as does the skin of peanuts. When this skin is removed before roasting, as it may be by half an hour's soaking, the product is improved.

Although these roasted legumes may not be needed as an addition to our bill of fare, it is easy to see how valuable they may be to the Arab who toils over arid plains or to the native of India in his mountain journeys.

Our common split pea is also palatable when parched. Parched peas are too hard for any but the strongest teeth, and, as used in India, they are ground and cooked after parching. The roasted chick-pea is also used as a substitute for coffee. The roasted peanut is spoken of later.

PEA AND BEAN FLOUR

Since it has been shown by such investigations as those of Strumpell that the legumes when ground into flour and cooked in soup or baked in cakes are much more completely digested than when cooked whole, it would seem that bean, pea and lentil flour, as such would be common in the market. It is, however, offered only in small packages mixed with the flour of grains and sold under various trade names as a nutritious and digestible food, especially recommended for invalids. In preparations for the market it has been cooked for a long time under pressure.

In certain countries of Europe a proportion of bean flour is mixed with wheat flour for bread making, especially with wheat which has a low percentage of gluten or that in which the gluten has deteriorated in quality because of the sprouting of the grain wet seasons. In such cases an addition of 2 to 4 per cent is thought to improve the bread, and 2 per cent, if stamped on the package, is allowed by law.

SOUP TABLETS AND PEA SAUSAGE

Finely ground peas, beans, and lentils form the basis of many soup tablets and condensed foods used extensively by armies, explorers, etc. The best known is the "pea sausage," which did so much good service for the German troops in the Franco-Prussian war. It was invented by a cook, and the German Government bought the secret of its preparation. It consists of pea and lentil flour well cooked, evaporated, and mixed with a proportion of bacon, the proper seasonings, and some preservative. Mixed with hot water, it made a very nutritious soup for the soldier. It was found by the German army to be invaluable, if used only in emergencies, but its continuous use brought on digestive disturbances and the eater soon tired of its taste.

PEANUTS AND PEANUT PREPARATIONS

Of the 4,000,000 bushels of nuts raised in this country 3,000,000 bushels are used as roasted peanuts. The remainder of the crop and the peanuts of an inferior grade go to the confectioner and appear in peanut candy and

other confections. Therefore at present the peanut, as used among us, is hardly to be considered a food, but, as already said, only as a food accessory or luxury. It is quite possible, however, that this highly nutritious and cheap product of our Southern fields may come to be used in more ways than it is at present, and especially in combination with other food materials.

The roasted nut, ground into an oily meal and generally mixed water to the consistency of butter, has been put on the market and is used to spread on bread. There are those who like its flavor when it is fresh. There seems to be but little known as to its digestibility in this form.

Peanut oil—At present the American peanut crop is not large enough to more than supply the roaster and the confectioner, hence the expressing of oil from the peanut has never become established here, but in Europe large quantities of the African-raised nut are used for this purpose. The shelled nuts contain from 30 to 50 per cent of oil. The oil is said to be of fairly good flavor, but inferior to olive oil. In 1899 some 80,000 tons of the nuts were used in Marseilles alone for oil making. The unhusked nuts are passed between a pair of rapidly revolving grooved rollers and the shells and red inner skins are then removed by a winnowing process with the use of air currents and oscillating sieves. The cleaned kernels are ground and then enveloped in fibrous mats and pressed to extract the oil.

According to Brannt, "the first cold pressure yields 16 to 18 per cent of very fine table oil. The residue is then broken up, moistened with water, and again cold pressed, yielding 7 to 8 per cent of more or less valuable oil, used for table purposes and burning. The residue from this is heated and then pressed, giving 7 to 8 per cent more oil, unfit for table use, but used for soap and lubricating." The finer grades of oil are sold as salad oil alone or mixed with olive oil.

Peanut cake—When the oil has been pressed from the ground peanut, the mass remaining, called oil cake, is used for fattening cattle. Some experiments have also been made as to its food value for human beings. Containing, as it does, 47 per cent of protein and 9 per cent of fat and starch, and costing about 5 cents a pound, this food attracted the attention of German scientists. The oil cake was broken up and cooked a long time in water and eaten as a soup or porridge in a hospital. Most of those who tried it ate it with apparent relish, not once only, but again and again. No effort seems to have been made to ascertain to what extent it was digested, and the use of the cake does not seem to have passed the experimental stage.

COMPARITIVE VALUE OF LEGUMES IN RELATION TO THEIR COST

The legumes have been spoken of as economical foods. In the table below is shown the nutrients and energy furnished by 10 cents' worth of the different fresh, dried, and canned legumes commonly eaten in the United States. For purposes of comparison similar values are included for some of the common animal and vegetable foods. In all cases the values are calculated on the basis of the composition of the food materials as purchased, and include the usual amounts of inedible material (pods, bones, etc.). The prices selected per pound are necessarily somewhat arbitrary. They are, however, based on actual market conditions found in dietary studies and other investigations, and are believed to represent a fair range of prices. The legumes, although staple foods, have not yet attained the importance of the cereal grains, and therefore vary more in price

NUTRIENTS FURNISHED FOR TEN CENTS IN LEGUMES AND OTHER FOOD MATERIALS AT CERTAIN PRICES PER POUND

FOOD MATERIALS AS PURCHASED.	PRICES PER POUND.	TEN CENTS WILL PAY FOR—				
		TOTAL FOOD MATERIAL.	PROTEIN.	FAT.	CARBO-HYDRATES.	FUEL VALUE.
	Cents	Pounds	Pound	Pound	Pounds	Calories
Kidney beans, dried.....	5	2.00	0.45	0.04	1.19	3,210
Frijoles, dried.....	4	2.50	.55	.03	1.63	4,190
Lima beans, fresh, in pod....	3	3.33	.11	.01	.33	850
Do.....	4	2.50	.08	.01	.25	640
Lima beans, fresh, shelled....	6	1.67	.05	.01	.17	485
Do.....	8	1.25	.04	.....	.12	320
Lima beans, canned.....	6	1.67	.07	.01	.24	600
Lima beans, dried.....	4	2.50	.45	.04	1.05	4,065
Do.....	6	1.67	.30	.03	1.10	2,715
String beans, fresh, 20 cents per peck.....	2	5.00	.11	.02	.35	900
String beans, fresh, 30 cents per peck.....	3	3.33	.07	.01	.23	600
Beans, baked, canned.....	3	3.33	.23	.08	.05	2,000
Do.....	5	2.00	.14	.05	.39	1,200
Lentils, dried.....	10	1.00	.26	.61	.59	1,620
Do.....	6	1.67	.43	.02	.99	2,705
Peas, green, in pod, 20 cents per peck.....	2	5.00	.18	.01	.49	1,275
Peas, green, in pod, 30 cents per peck.....	3	3.33	.12	.01	.33	850
Peas canned.....	5	2.00	.07	.....	.20	510
Do.....	7	1.43	.05	.....	.14	365
Peas dried.....	3	3.33	.82	.03	2.06	5,510
Do.....	4	2.50	.62	.03	1.55	4,140
Do.....	5	2.00	.49	.02	1.24	3,310
Cowpeas, green, shelled.....	5	2.00	.19	.01	.45	1,240
Cowpeas, dried.....	2	5.00	1.07	.07	3.04	7,950
Wheat flour.....	2	5.00	.57	.05	3.76	8,250
Do.....	2.5	4.00	.46	.04	3.00	6,600
Do.....	3	3.33	.38	.03	2.50	5,495
Wheat bread.....	3	3.33	.31	.04	1.77	4,045
Do.....	5	2.00	.18	.03	1.06	2,430
Do.....	8	1.25	.12	.02	.66	1,580
Corn meal.....	2	5.00	.46	.10	3.77	8,275
Do.....	3	3.33	.31	.06	2.51	5,510
Oatmeal.....	3	3.33	.54	.24	2.25	6,195
Do.....	5	2.00	.32	.14	1.35	3,720
Rice.....	6	1.67	.13	.01	1.32	2,720
Do.....	8	1.25	.10	.....	.99	2,040
Potatoes, 45 cents per bushel.....	0.75	13.33	.24	.01	1.96	4,130
Potatoes, 60 cents per bushel.....	1	10.00	.18	.01	1.47	3,100
Potatoes, 90 cents per bushel.....	1.5	6.67	.12	.01	.98	2,070
Cabbage.....	4	2.50	.04	.01	.12	315
Do.....	5	2.00	.03	.....	.10	250
Beef sirloin.....	10	1.00	.16	.18	.....	1,040
Do.....	15	.66	.11	.12	.....	685
Do.....	20	.50	.08	.09	.....	520
Do.....	25	.40	.06	.07	.....	415
Beef, round.....	8	1.25	.24	.16	.....	1,120
Do.....	12	.83	.16	.11	.....	745
Do.....	16	.63	.12	.08	.....	565
Ham, smoked.....	10	1.00	.14	.33	.....	1,675
Do.....	16	.63	.09	.21	.....	1,055
Do.....	22	.46	.07	.15	.....	770
Salt pork.....	12	.83	.02	.72	.....	3,045
Codfish, fresh.....	6	1.67	.14	.....	.....	275
Do.....	10	1.00	.08	.....	.....	165
Codfish, dried, salt.....	6	1.67	.27	.01	.....	585
Do.....	8	1.25	.20	.01	.....	395
Eggs, 15 cents per dozen.....	8.8	1.14	.15	.11	.....	725
Eggs, 25 cents per dozen.....	14.7	.68	.09	.06	.....	430
Eggs, 35 cents per dozen.....	20.6	.49	.06	.05	.....	310
Milk, 3 cents per quart.....	1.5	6.67	.22	.27	.33	2,170
Milk, 6 cents per quart.....	3	3.33	.11	.13	.17	1,080
Milk, 8 cents per quart.....	4	2.50	.08	.10	.13	815
Cheese, whole milk.....	12	.83	.22	.28	.02	1,620
Do.....	16	.63	.16	.21	.02	1,230

It will be seen that at the prices selected the dried legumes furnish more protein and energy than almost any food material except cereal grains, while the fresh legumes are directly comparable with our most nutritious green vegetables. Dried cowpeas at the price noted above furnish more protein and energy per pound than any other legumes and almost twice as much protein and nearly the same amount of energy as wheat flour at two cents per pound. Dried kidney beans at five cents per pound supply about the same protein and half as much energy as wheat flour at two and one-half cents per pound. The facts brought out in the above table show the importance of legumes when considered from the standpoint of pecuniary economy and go to prove that they may profitably be used to a considerable extent as a source of protein when the diet is deficient in this constituent and the income is limited.

SUMMARY

The green or immature pea and bean are among our most valuable green vegetables and fully deserve the place they now hold on our bill of fare. The value of the dried pea, bean, and lentil is such that one or more representatives are found in every country as a staple food, and they have been thus used from the earliest times. They are especially rich in protein, the nitrogenous constituent which forms the chief nutrient of meat, and are thus fitted to take the place of part of the meat in any dietary. Since in comparison with their value their price is low, they must be considered among vegetable foods as next in importance to bread. As compared with the cereals the legumes are (1) less completely digested if eaten in considerable quantities; (2) it is improbable that they can be made into any form of palatable bread, and (3) their flavor is less generally liked, and on that account will not be made a regular daily food except by people who are forced to it by necessity. In view of their low cost and high nutritive value, however, they may profitably be used even to a greater extent than they are at present.

Care in the preparation of legumes is very important both as regards their digestibility and their flavor.

XXIV

EGGS AND THEIR USES AS FOOD*

INTRODUCTION

Perhaps no article of diet of animal origin is more commonly eaten in all countries or served in a greater variety of ways than eggs. Hens' eggs are most common, although the eggs of ducks, geese, and guinea fowls are used to a greater or less extent. More rarely turkeys' eggs are eaten, but they are generally of greater value for hatching.

The eggs of some wild birds are esteemed a delicacy. Plover eggs are prized in England and Germany, while in this country the eggs of sea birds have long been gathered for food. On the eastern shore of Virginia, eggs of the laughing gull are frequently eaten, and the eggs of gulls, terns, and herons were a few years ago gathered in great quantities along the coast of Texas. Thousands of eggs of gulls and murre have been gathered annually on the Farallon Islands, off the coast of California.¹

Other eggs besides those of birds are sometimes eaten. Turtle eggs are highly prized in most countries where they are abundant. They were once more commonly eaten in America than now, possibly owing to the more abundant supply in former times. The eggs of the terrapin are usually served with the flesh in some of the ways of preparing it for the table. Fish eggs, especially those of the sturgeon, are eaten in large quantities, preserved with salt, under the name of caviar. Shad roe is also a familiar example of the use of fish eggs as food. Mention may also be made of the use of the eggs of alligators, lizards, serpents, and some insects by races who lack the prejudices of Western nations. However, in general, the term eggs, when used in connection with food topics, refers to the eggs of birds, usually domestic poultry, and is so used in this bulletin.

The appearance of an egg—the shell with its lining of membrane, inclosing the white and yolk—is too familiar to need any discussion. The physiological structure of the egg is perhaps less familiar. A fertile egg contains an embryo and is at the same time a storehouse of material for the development and growth of the young individual from the embryo, until it has reached such a stage that life is possible outside the narrow limits of the shell. The embryo is situated quite close to the yolk, which furnishes the nutritive material for its early development, the white being used later.

For convenience, birds may be divided into two groups: (1) Those in which the young are hatched full-fledged and ready in a great measure to

*U. S. Department of Agriculture—C. F. Langworthy—Farmers' Bulletin, 128. Permission to reprint kindly wanted.

¹ The danger of exterminating these desirable birds by gathering their eggs for food has been discussed in the U. S. Dept. Agr. Yearbook, 1899, p. 270.

care for themselves, and (2) those in which the young are hatched unfledged and entirely dependent upon the parents for some time. Domestic poultry are familiar examples of the first group; robins and sparrows, of the second. The eggs of the two classes differ materially in composition. It seems evident that more nutritive material is needed proportionally in the first case than in the second, since the growth is continued in the egg until the bird reaches a more advanced stage of development. The quite marked differences in composition of the two sorts of eggs have been shown by chemical studies but need not be referred to further in the present discussion.

Since in all cases the egg is designed to furnish the sole source of material for growth and development of the young individual for a considerable time, it is evident that it must contain all the elements required; that is, that it must be a perfect food for the purpose intended. Milk is another familiar example of animal food containing all the elements of a complete food for the young and growing individual. Milk and eggs are frequently spoken of as perfect foods on this account. The designation is, however, misleading, for although it is true that they contain all the required elements for the growth and maintenance of the young bird or the young mammal, as the case may be, the elements are not in the right proportion for the sole nourishment of an adult individual. The food value of eggs is discussed in greater detail beyond.

Considering both wild and domestic birds, the color of the shell ranges from white through a variety of tints and mottlings. The eggs of domestic fowls are not highly colored; those of hens vary from white to a more or less brown tone, the eggs from a particular breed of hens being always of the same color. The eggs of ducks are bluish white; those of geese are commonly white; the eggs of guinea fowls are light brown, more or less mottled with a deeper shade; and the eggs of turkeys are speckled with a yellowish brown. Any special coloring of eggs of wild birds is commonly explained as a protective measure which has been developed to render the eggs inconspicuous in their normal surroundings, and therefore less easily found by their enemies. Such reasoning would indicate that the observed differences in the color of hens' eggs are due to characteristics which different breeds have inherited from remote wild ancestors. The color of the shells, whatever its reason, is a feature which has some effect on the market value of eggs of domestic poultry, though not upon their food value.

USES OF EGGS

The methods of serving eggs alone or in combination with other food materials are very numerous. Cooked in various ways they are a favorite animal food, taking the place of meat to a certain extent, while raw eggs, usually seasoned in some way, are by no means infrequently eaten. Boiled eggs are often used for garnishing or ornamenting different foods. Eggs are combined with other materials in various ways in many made dishes. They are used in making cakes and such foods to improve their flavor, color, and texture, while in custards, creams, etc., they thicken the material and give it the desired consistency. The white of the egg is also employed in making icings and confectionery. Well beaten or whipped egg white is used to leaven many forms of cakes and similar foods, as well as to improve the flavor. The beaten white encloses air in small bubbles, which become dis-

tributed throughout the mass of dough in mixing. The heat of cooking expands the air and makes the walls of the air bubbles firm, so that the porous structure is retained. The power to inclose and retain air when beaten varies, being greatest in the fresh egg and much lessened in packed or old eggs. Convenient leavening powders have lessened the number of eggs used for this purpose. Sponge cake, however, is a familiar example of food so leavened. This use of eggs explains some of the recipes in old cookery books which call for such large numbers of eggs. These uses are all familiar; the reasons for them are doubtless seldom thought of.

There are several simple ways of cooking eggs which are very commonly followed. Thus, the egg in the shell is cooked by immersion in hot or boiling water or is less commonly roasted. After removal from the shell, the egg is cooked in hot water or in hot fat. In the latter case it may or may not be beaten or stirred. Combined with other materials to form various made dishes, eggs are boiled, baked, steamed, or fried as the case may be. The total number of methods of serving and preparing eggs is very large, but in nearly every case it will be found that the method of preparation is only a more or less elaborate modification of one of the simple methods of cooking.

When cooked in different ways there are marked changes in the appearance and structure of eggs. As ordinarily applied, the term "boiled eggs" refers to eggs cooked in the shell in hot, though not necessarily boiling, water. The resulting product varies greatly, according to the length of time the cooking is continued, the method of procedure, etc. Perhaps the most usual household method of "boiling eggs" is to immerse them for a longer or shorter time in boiling water. An egg placed in boiling water not over two minutes will have a thin coating of coagulated white next the skin, the remainder will be milky, but not solid, while the yolk, though warm, will be entirely fluid. This stage may be called "very soft boiled." If the egg is kept in boiling water two minutes, or a little over, the white becomes entirely coagulated. The egg thus cooked may be termed "waxy." If the boiling is extended to three minutes or so, the egg shows a tendency to rise in the water and will be solid throughout, *i. e.*, the "solid boiled." If the boiling is continued up to ten minutes or longer, the "hard-boiled" egg results. The white of such an egg is hard and elastic and the yolk crumbles readily. All these changes are due principally to the more or less complete coagulation and hardening of the albumen of the egg by heat.

Numerous experiments have been made to show the changes which actually take place when egg albumen is heated. If the egg white is gently warmed no change is noticed until the temperature reaches 134 degrees F., when coagulation begins. White fibers appear, which become more numerous, until at about 160 degrees F. the whole mass is coagulated, the white almost opaque, yet it is tender and jelly-like. If the temperature is raised and continued to 212 degrees F. (the temperature of boiling water), the coagulated albumen becomes much harder, and eventually more or less tough and horn-like; it also undergoes shrinkage. When the whole egg is cooked in boiling water the temperature of the interior does not immediately reach 212 degrees F., several minutes being probably required. It has been found by experiment that the yolk of egg coagulates firmly at a lower temperature than the white.

The changes in the albumen noted above suggest the idea that it is not desirable to cook eggs in boiling water in order to secure the most satisfactory product. Those who have given attention to the science as well as the practice of cookery recommend "soft-cooked," "medium-cooked," and "hard-cooked" eggs, all of which are cooked at a temperature lower than 212 degrees F. In soft-cooked eggs, properly prepared, the white resembles a soft, thick curd, while the yolk is fluid. Except for a suggestion of rawness, there will be little flavor, provided fresh eggs are used. Medium-cooked eggs are more thoroughly cooked than those just mentioned, the results being secured by longer cooking or by a somewhat higher temperature. The white is soft and tender and the yolk slightly thickened. The flavor (which is developed by cooking) is more pronounced than that of a soft-cooked egg and is generally considered more agreeable.

When an egg is covered with boiling water in a bain-marie or double boiler, and the temperature of the water in the outer vessel maintained at 180-190 degrees F. for thirty to forty-five minutes, the hard-cooked egg results. In this the yolk should be dry and mealy and the white solid, yet tender.

The directions given for preparing soft-cooked, medium-cooked, and hard-cooked eggs vary. The methods described in standard cookery books without doubt give the desired results if sufficient care is exercised. The chief difficulty encountered by most cooks is to secure uniform results, especially with soft-cooked and medium-cooked eggs. It must be remembered that such results cannot be expected when conditions vary. The time of cooking, the amount of water used, the number, size, and freshness of the eggs, and the kinds of vessels used are important factors. Thus, eggs which have been kept in an ice-chest require more heat to warm them before cooking begins than do those which have been kept at room temperature. Again, so apparently trivial a detail as the sort of vessel used (whether earthen or metal) or the place where the vessel stands during cooking may produce very different results. Many persons prefer to have eggs cooked at table in a chafing dish or other suitable vessel. In such cases the conditions may be controlled with comparative ease and uniform results obtained with a little practice if sufficient care is observed.

The following methods of preparing soft-cooked and medium-cooked eggs have been found to give uniform results in laboratory tests at the University of Illinois: Using a granite-ware stewpan of one quart capacity, one pint of water was heated over a gas flame; when the water boiled the gas was turned off and an egg which had been kept in a refrigerator was dropped into the water. Without disturbing the vessel it was covered closely and the egg allowed to remain in the water six minutes. It was then soft-cooked. As shown by tests, when the egg was dropped into the water, the temperature fell almost at once to 185 degrees F. and then slowly to 170-171 degrees F. If the egg remained in the water eight minutes, it was medium-cooked. In this case the temperature of the water at the end of the cooking period had fallen to 162-164 degrees F.

Uniform results can be obtained in the kitchen as well as in the laboratory if sufficient attention is given to details. Bearing clearly in mind the end desired, each cook must experiment for herself, as it is impossible to give directions which will apply to all cases.

The same changes which have been noted above as taking place in egg yolk and white when heat is applied in preparing boiled eggs take place when other methods of cooking are followed, though they are not always apparent.

Poached or dropped eggs are removed from the shell and then cooked in water. Thudichum recommends the use of salted water to which a very little vinegar has been added. The reason for this is perhaps that acetic acid (vinegar) tends to precipitate albumen; that is, to prevent a loss due to some of the egg being dissolved in the water. Flavor may also be one of the objects sought.

Fried eggs are generally cooked in a flat pan, in a little hot fat, oil, or butter, and may be either soft or hard, according to the length of time employed in the process. Eggs are also occasionally baked in much the same manner that they are fried.

The omelet is generally regarded as one of the most appetizing forms in which eggs can be served. It consists of the beaten egg with a little milk, water, and cream or melted butter added, quickly cooked in a little fat or butter in a suitable pan, and folded over so that it may be turned out of the pan in a half-round form. Some cooks insist that the best omelets are made by using hot water instead of milk or cream. The hot water is stirred into the egg yolk in the proportion of 1 tablespoonful to an egg. Scrambled eggs resemble an omelet in method of preparation, but no effort is made to preserve the characteristic form and appearance of the omelet. Generally speaking, lightness is desired in an omelet and thorough mixing in scrambled eggs. The former is secured by beating; the latter by stirring. Omelets are sometimes made with the addition of various materials, such as parsley, jams, etc. Many so-called omelets are made in which flour is used. These are more properly pancakes, and vary very greatly according to the ingredients used. Such dishes, as well as sweet omelets, etc., are treated of in cookery books, as are also many other ways of serving eggs which are in principle the same as those already noted, but in which the final appearance is more or less modified.

The foods in which eggs are combined with other materials range from a simple custard or cake to the most elaborate of the confectioner's products. In all such dishes, as previously noted, eggs are used to give consistency, color, flavor, or lightness.

Eggs are especially rich in protein (the nitrogenous ingredient of food). This material is required by man to build and repair the tissues of the body. Some energy is also furnished by protein, but fats and carbohydrates supply the greater part of the total amount needed. Combining eggs with flour and sugar (carbohydrates) and butter, cream, etc. (fat), is perhaps an unconscious effort to prepare a food which shall more nearly meet the requirements of the body than either ingredient alone. When eggs, meat, fish, cheese, or other similar foods rich in protein are eaten, such other foods as bread, butter, potatoes, etc., are usually served at the same time, the object being, even if the fact is not realized, to combine the different classes of nutrients into a suitable diet. The wisdom of such combination, as well as of other generally accepted food habits, was proved long ago by practical experience. The reason has been more slowly learned.

As previously stated, egg white when heated at the temperature of boiling water for a considerable time becomes hard and contracts. This explains the curdling of custards, shrinkage and toughening of omelets, souffles, meringues, sponge cake, and similar mixtures. The firm coagulation of albumen at 212 degrees F. explains the use of egg white for clarifying coffee, soup, or other liquids. The albumen, which is mixed with the liquid before boiling, coagulates and incloses the floating particles, leaving the liquor clear. When eggs are removed from the shell a little of the white usually clings to the inner surface unless it is scraped. Such eggshells are often used for clarifying purposes instead of the whole egg. The clarifying properties are, of course, due to the egg white and not to the shells.

The uses of eggs for other purposes than food are numerous. Large quantities of egg white are used in the manufacture of albumen paper for photographic purposes, and the egg white and yolk, and products made from them, are very important in the manufacture of many different articles.

DESCRIPTION AND COMPOSITION OF EGGS

Size—The eggs of different kinds of domestic poultry vary in size as well as appearance, and there is always a considerable range in the size of eggs of different breeds; thus, hens' eggs range from the small ones laid by bantams to the large ones laid by such breeds as Light Brahmas. On an average, a hen's egg is 2.27 inches in length and 1.72 inches in diameter or width at the broadest point, and weighs about two ounces, or eight eggs to the pound (one and one-half pounds per dozen). Generally speaking, the eggs of pullets are smaller than those of old hens, those of ducks somewhat larger than hens' eggs, while those of turkeys and geese are considerably larger. Guinea eggs, on an average, measure $1\frac{1}{8}$ by $1\frac{1}{2}$ inches, are rather pointed at one end, and weigh about 1.4 ounces each, or seventeen ounces to the dozen. Goose eggs weigh about 5.5 to 6.7 ounces each, or about five pounds to the dozen—that is, more than three times as much as hens' eggs. The eggs of wild birds are said to be smaller than those of the same species when domesticated. Wild ducks' eggs are said to be, on an average, 1.97 to 2.17 inches in diameter, domestic ducks' eggs 2.36 to 2.56 inches.

Composition—The shells of hens' eggs constitute about 11 per cent, the yolk 32 per cent, and the white 57 per cent of the total weight of the egg. According to tests made at the New York State Experiment Station, white-shelled eggs have a somewhat heavier shell than brown-shelled eggs. The shell of a duck's egg constitutes about 14 per cent of the total weight, and that of a plover egg 10 per cent. The following table shows the composition of hens' eggs, raw and cooked, brown-shelled and white-shelled, and of egg white and yolk, as well as the composition of the egg (whole egg white and yolk) of the guinea fowl, duck, goose, turkey, and plover, also evaporated eggs and egg substitutes. For purpose of comparison, the composition of beefsteak and several other familiar animal foods, and of wheat flour and potatoes, is also added.

AVERAGE COMPOSITION OF EGGS, EGG PRODUCTS, AND CERTAIN OTHER FOODS

	REFUSE.	WATER.	PROTEIN	FAT.	CARBO- HYDRATES	ASH.	FUEL VALUE PER LB.
Hen:	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Calories
Whole egg as pur- chased	11.2	65.5	11.9	9.3	.....	0.9	635
Whole egg, edible portion		73.7	13.4	10.5	.....	1.0	720
White		86.2	12.3	.2	.....	.6	250
Yolk		49.5	15.7	33.3	.....	1.1	1,705
Whole egg boiled, edible portion		73.3	13.2	12.0	.....	.8	765
White-shelled eggs as purchased	10.7	65.6	11.8	10.8	.....	.6	675
Brown-shelled eggs as purchased	10.9	64.8	11.9	11.2	.....	.7	695
Duck:							
Whole egg as pur- chased	13.7	60.8	12.1	12.5	.....	.8	750
Whole egg, edible portion		70.5	13.3	14.5	.....	1.0	860
White		87.0	11.1	.03	.....	.8	210
Yolk		45.8	16.8	36.2	.....	1.2	1,840
Goose:							
Whole egg as pur- chased	14.2	59.7	12.9	12.3	.....	.9	760
Whole egg, edible portion		69.5	13.8	14.4	.....	1.0	865
White		86.3	11.6	.02	.....	.8	215
Yolk		44.1	17.3	36.2	.....	1.3	1,850
Turkey:							
Whole egg as pur- chased	13.8	63.5	12.2	9.7	.....	.8	635
Whole egg, edible portion		73.7	13.4	11.2	.....	.9	720
White		86.7	11.5	.03	.....	.8	215
Yolk		48.3	17.4	32.9	.....	1.2	1,710
Guinea fowl:							
Whole egg as pur- chased	16.9	60.5	11.9	9.9	.....	.8	640
Whole egg, edible portion		72.8	13.5	12.0	.....	.9	755
White		86.6	11.6	.03	.....	.8	215
Yolk		49.7	16.7	31.8	.....	1.2	1,655
Plover:							
Whole egg as pur- chased	9.6	67.3	9.7	10.6	.....	.9	625
Whole egg, edible portion		74.4	10.7	11.7	.....	1.0	695
Evaporated hen's eggs Egg substitute		6.4	46.0	36.0	7.1	3.6	2,585
Pudding (custard) powder		11.4	73.9	.3	5.3	9.1	1,480
Cheese as purchased		13.0	2.1	3.4	80.9	.6	1,690
Sirloin steak as pur- chased		34.2	25.9	33.7	2.4	3.8	1,950
Sirloin steak, edible portion	12.8	54.0	16.5	16.1	.....	.9	985
Milk		61.9	18.0	18.5	.....	1.0	1,130
Oysters in shell as purchased		87.0	3.3	4.0	5.0	.7	325
Oysters, edible portion	81.4	16.1	1.2	.2	.7	.4	45
Wheat flour		86.9	6.2	1.2	3.7	2.0	235
Potatoes as purchased	20.0	12.0	11.4	1.0	75.1	.5	1,650
Potatoes, edible portion		62.6	1.8	.1	14.7	.8	310
		78.3	2.2	.1	18.4	1.0	385

^a European analyses.

The above figures represent average values. Individual specimens vary more or less from the average.

As is shown by analysis, eggs consist chiefly of two nutrients—protein and fat—in addition to water and mineral matter or ash. Carbohydrates are present in such small amounts that they are usually neglected in the analy-

sis. The protein or nitrogenous matter is the nutrient which is needed to build and repair body tissue, as already stated, while the fat is useful for supplying energy. Some energy is also derived from protein. Mineral matter is required by the body for many purposes, but less is definitely known concerning the kind and amount required than in the case of the other constituents.

In composition, eggs of all sorts resemble such animal foods as meat, milk, and cheese, more than such vegetable foods as flour and potatoes. As will be seen by the figures in the above table, hens' eggs and those of other domestic fowls do not differ greatly in composition. Neither does the cooked egg vary materially in composition from the raw, though it varies markedly in texture. The yolk and white differ greatly in composition. The yolk contains considerable fat and ash, while the white is practically free from fat and has a very small ash content. The white contains somewhat less protein and about half as much water as the yolk. As is usually the case with our familiar foods, the water is not visible as such, but is combined or mingled with the other constituents, so that the whole food is more or less moist, liquid, or juicy.

The figures quoted in the table show that there is practically no difference in composition between hens' eggs with dark shells and those with white shells, although there is a popular belief that the former are "richer." This point was studied by the New York State and California Experiment Stations, many analyses of the two sorts of eggs being made. At the California Experiment Station the brown-shelled eggs were laid by Partridge Cochins, Dark Brahmas, Black Langshans, Wyandottes, and Barred Plymouth Rocks. The white-shelled eggs were laid by Brown Leghorns and Buff Leghorns, White Minorcas, and Black Minorcas. The Michigan Experiment Station also analyzed the eggs of a number of different breeds, though the special object was not to determine whether there was any relation between the color of the shell and the composition of the eggs. However, no constant variation in the eggs of the different breeds was observed. These tests and others like them justify the statement that the eggs of one breed, whatever the color of the shells, are as nutritious as those of another, provided they are of the same size and the fowls are equally well fed.

As shown by their composition, eggs are nutritious food. They are less concentrated—*i. e.*, contain more water—than cheese, but are more concentrated than milk or oysters. In water content they do not differ greatly from the average value for lean meat. The kinds and amounts of nutrients in eggs indicate that they may be properly used in the diet in the same way as most other animal foods, and this belief is confirmed by the experience of uncounted generations.

The table shows the nutrients in different kinds of eggs and in a few other foods. Many studies have been made of the chemical bodies making up the different classes of nutrients. Egg white is sometimes said to be pure albumen. In reality it consists of several albumens, and, according to many observers, a little carbohydrate material. The phosphorus in the albumen of the egg white is equivalent to about 0.03 per cent phosphoric acid. The chief ash constituent is sodium chlorid (common salt).

A very extended investigation of the white of egg was made at the Connecticut State Experiment Station. The "albumen" or protein of egg

white was found to consist of four bodies—ovalbumen, conalbumen, ovomucin, and ovomucoid. The ovalbumen is the chief constituent and makes up the greater part of the egg white. The conalbumen has much the same chemical properties as ovalbumen. Ovomucin and ovomucoid are glycoproteids, and are present in small amounts.

Egg yolk contains a number of different bodies, including about 15 per cent vitellin (a proteid); 20 per cent palmatin, stearin, and olein (the fatty constituents); and 0.5 per cent coloring matter, besides small amounts of lecithin (a fat-like body containing phosphorus), nuclein, etc. The total phosphorus in the yolk is equivalent to a little over 1 per cent of phosphoric acid. Besides phosphorus, the yolk contains such chemical elements as calcium, magnesium, potassium, and iron in the form of salts and other chemical compounds. The protein of egg yolk was studied extensively at the Connecticut State Experiment Station. According to these investigations it contains a large amount of proteid matter combined with lecithin. The name lecithin-nucleo-vitellin is proposed for this compound, which behaves like a globulin. It is soluble in a solution of salt. As prepared in the laboratory the lecithin-nucleo-vitellin contained from 15 to 30 per cent lecithin. A lecithin-free body insoluble in salt solution was also isolated. This was called nucleo-vitellin.

One of the constituents of egg albumen is sulphur. The dark stain made by eggs on silver is commonly and doubtless correctly attributed to the formation of silver sulphid. The albumens are readily decomposed with the liberation of hydrogen sulphid. The bad odor of rotten eggs is due largely to the presence of this gas and phosphurated hydrogen, which is also formed. The shell of the egg is porous, and the micro-organisms which cause the egg to ferment—*i. e.*, to rot or spoil—gain access to the egg through the minute openings. Like the mold spores, these micro-organisms are widely distributed.

Composition of shell.—In the table no figures are given for the composition of the eggshell, which, of course, has no food value. The shell of the hen's egg is made up very largely of mineral matter, containing 93.7 per cent calcium carbonate, 1.3 per cent magnesium carbonate, 0.8 per cent calcium phosphate, and 4.2 per cent of organic matter. The shells of goose eggs, on an average, have the following percentage composition: Calcium carbonate, 95.3; magnesium carbonate, 0.7; calcium phosphate, 0.5, and organic matter, 3.5. The shells of ducks' eggs contain 94.4 per cent calcium carbonate, 0.5 per cent magnesium carbonate, 0.8 per cent calcium phosphate, and 4.3 per cent organic matter. The shells of other eggs are doubtless of much the same composition.

FLAVOR OF EGGS

It is generally conceded that eggs which are perfectly fresh have the finest flavor. After eggs have been kept for a time the flavor deteriorates, even if there is no indication of spoiling. Such differences are especially important when eggs are used for table purposes. Stale eggs are not regarded as palatable, and the flavor of spoiled eggs is such that for this, if for no other reason, they are totally unfit for food. The flavor of even perfectly fresh eggs is not always satisfactory, since it is influenced more or less by the character of the food eaten by the laying hens. The New York

State Experiment Station studied the effect of different rations upon the flavor of eggs. Those laid by hens fed a highly nitrogenous ration were inferior to those from hens fed a carbonaceous ration. They had a disagreeable flavor and odor, the eggs and yolk were smaller, and the keeping qualities were inferior. In a test at the Massachusetts (Hatch) Experiment Station to compare cabbage and clover rowen as the green portion of a ration for laying hens, it was found that the eggs produced on the former ration, although heavier and possessing a higher percentage of dry matter, protein, and fat, were inferior in flavor and cooking qualities to eggs produced on the ration containing clover. The North Carolina Experiment Station studied the effect of highly flavored food upon the eggs produced. A small quantity of chopped wild onion tops and bulbs was added to the feed of a number of hens. After about two weeks the onion flavor was noticed in the eggs laid. When the amount of onion feed was increased the flavor became so pronounced that the eggs could not be used. A week after the feeding of onions was discontinued the disagreeable flavor was no longer noticed. From these tests it appears that the flavor of eggs may be materially influenced by the food consumed. This is a matter of importance, especially when poultry are kept to supply eggs for table use.

DIGESTIBILITY OF EGGS

Raw eggs or eggs only slightly cooked are commonly said to be very digestible, the idea being obviously that they digest readily without giving rise to pain or other physical discomfort. The term digestibility has another meaning and one which is commonly intended when it is used in the discussion of food values. This refers to the thoroughness of digestion, that is, to the total amount of material which any food gives up to the body in its passage through the digestive tract. Since only soluble or possibly emulsified matter can pass through the walls of the stomach and intestines and be taken up into the circulation to nourish the body, it follows that only material which is soluble or is rendered soluble by the action of pepsin, trypsin, and other ferments in the digestive juices, is truly digestible. The original condition of food, the method of cooking, and the amount eaten at a given time are among the factors which determine the quantity of any given material which can be digested.

Statements are frequently made with regard to the length of time required to digest different foods. Many of these are doubtless far from accurate, as the subject is not easy to study. By methods of artificial digestion the length of time required to render different foods soluble has been frequently tested. It is possible to use in the experiments the same digestive ferments which occur in the body and to approximate body temperature, etc., but it is quite certain that all the conditions of digestibility in the body cannot be reproduced in the laboratory. The results obtained are interesting and often valuable, but it is worthy of note that careful investigators are much slower to make sweeping deductions from them than are popular writers on the subject.

Some years ago Dr. Beaumont, a United States Army surgeon, had an excellent opportunity for studying digestibility in the stomach. A healthy young man was accidentally wounded in the stomach by the discharge of a musket. In time the large wound inflicted healed, leaving a permanent

opening into the stomach, which was ordinarily closed by a valvular flap made by a fold of the stomach lining, which could be easily pushed aside and the interior of the stomach examined or the stomach contents removed as desired. Strange as it may seem, this could be done without giving the subject pain or annoyance, nor was his general health abnormal after the wound had healed in this curious way. For many years after the time of the accident (1822) the man was under Dr. Beaumont's care and observation. Very many experiments were made on the length of time required by different foods for digestion in the stomach, or "chymification." Many artificial digestion experiments were also made, using gastric juice removed from the man's stomach. Although these investigations were carried on long before the theories and methods of physiological chemistry now accepted were known, so much care was taken in making the experiments, and in recording the experimental data, that the work has never ceased to be of great value as well as interest. However, it should not be forgotten that Dr. Beaumont studied only digestion in the stomach; his work throws no light on digestion in the intestines. This is of especial importance in the case of starchy foods, as the digestion of starch, which is begun by the saliva, ceases in the stomach but is resumed in the intestines. The experiments reported include tests of the length of time required to digest eggs, hard and soft boiled, fried, roasted, and raw. The raw eggs were sometimes whipped and sometimes not. In all the tests fresh eggs were used. Hard boiled and fried eggs each required three and one-half hours for digestion in the stomach, *i. e.*, for the formation of chyme; soft boiled eggs required three hours; roasted eggs, two and one-fourth hours; raw eggs, not whipped, two hours, and raw eggs, whipped, one and one-half hours. When tested by the methods of artificial digestion followed by Dr. Beaumont, which approximate bodily conditions as closely as he was able to make them, the hard boiled eggs required eight hours for digestion; soft boiled eggs, six and one-half hours; raw eggs, not whipped, four and one-half hours; and raw eggs, whipped, four hours. The two methods gave results which agree in the relative length of time required for the digestibility of the different samples, though not in the actual time required. Similar results were obtained by the two methods with the greater part of the large number of foods studied. One of Dr. Beaumont's general deductions was that most of the common foods required from two to four hours to digest in the stomach. He says further:

The time required for the digestion of food is various, depending upon the quantity and quality of the food, state of the stomach, etc., but the time ordinarily required for the disposal of a moderate meal of the fibrous parts of meat, with bread, etc., is from three to three and one-half hours.

As regards the time required for digestion in the stomach it will be seen that in this investigation eggs compare favorably with other common foods. It must be remembered that digestion continues in the intestine, and that no data are furnished by these experiments for judging of this factor. This is an important matter, as food material which escapes digestion in the stomach may be thoroughly digested later in the intestine. This fact seems to have been often overlooked in the discussion of Dr. Beaumont's work.

Among later experiments on the digestibility of eggs by artificial methods, the work of the Minnesota Experiment Station may be cited. The object

was to study the thoroughness as well as the ease of digestion. Five experiments were made by means of a pepsin solution with eggs cooked under different conditions. Eggs were cooked for three minutes in water at 212 degrees F., giving a "soft-boiled" egg, and for five minutes and twenty minutes at the same temperature. The egg boiled three minutes and digested for five hours in pepsin solution, compared with one boiled twenty minutes and treated in the same way, showed 8.3 per cent undigested protein in the former, against 4.1 per cent undigested protein in the latter. Under similar treatment the egg boiled five minutes gave 3.9 per cent undigested protein. In all cases the egg was quite thoroughly digested. Another trial was then made in which the eggs were cooked for periods of five and ten minutes in water at 180 degrees F.—that is, the albumen was coagulated at a lower temperature than that of boiling water. In both of these cases the protein was entirely digested in five hours. These results would indicate that while the time and the temperature of cooking has some effect upon the rate of digestion, it does not very materially affect the total digestibility.

As regards the general deduction that eggs cooked for different lengths of time vary somewhat in the length of time for digestion under the experimental conditions, the results agree quite closely with those obtained by Dr. Beaumont.

Experiments have also been made with man to learn how thoroughly eggs are digested. In such tests it is usual to analyze the food and the feces, the latter being assumed to consist principally of undigested food. Deducting the amount of the different nutrients in the feces from the total amount consumed, shows how much of each nutrient was digested. Such an experiment was made at the Minnesota Experiment Station with a healthy man. A very considerable portion of the nitrogenous material and fat of the ration was furnished by eggs, the other foods eaten being potatoes, milk, and cream. About ninety per cent of the total nitrogenous material and over ninety per cent of the fat consumed were digested. In experiments at the University of Tennessee with healthy men on a diet of bread, milk, and eggs, from ninety-three to ninety-five per cent of both the protein and fat were digested. The conclusion therefore seems warranted that, as shown by composition and digestibility, eggs possess the high nutritive properties which are popularly assigned to them.

A German investigator, Rubner, some years ago tested the digestibility of hard-boiled eggs with a healthy man. No other food was eaten with the eggs. It was found that 95 per cent of the total dry matter and 97 per cent of the protein were digested. The fat was also very thoroughly assimilated. The percentage of total dry matter and protein digested was about the same as Rubner found in similar experiments in which meat only was eaten, while the percentage of fat digested was larger. Discussing these tests, Rubner says in effect:

From the fact that eggs are as completely digested as meat, it does not follow that they are digested in the same time, or that hard-boiled eggs do not produce more disturbance in the digestive organs. It is highly probable that there is no difference in the thoroughness of digestion of hard-boiled and soft-boiled eggs.

Jorissenne, discussing the digestibility of eggs with reference to some recent European work on the subject, states that he regards the yolk of raw, soft-

boiled, and hard-boiled eggs as equally digestible. The white of soft-boiled eggs being semiliquid, offers little more resistance to the digestive juices than raw white. The white of a hard-boiled egg is not generally very thoroughly masticated. Unless finely divided, it offers more resistance to the digestive juices than the fluid or semifluid white, and undigested particles may remain in the digestive tract many days and decompose. From this deduction it is obvious that thorough mastication is a matter of importance. Provided mastication is thorough, marked differences in the completeness of digestion of the three sorts of eggs, in the opinion of the writer cited, will not be found.

Perhaps the most extended study of the digestibility of eggs was carried on recently at St. Petersburg, by Tikhvinski. Two experiments, each divided into two periods of seven days, were made with a healthy man. In the first period of the first experiment, the diet consisted of hard-boiled eggs, bread, and meat; in the second, of soft-boiled eggs with bread and meat. The second experiment was made under similar conditions, except that the soft-boiled eggs were used in the first period and the hard-boiled in the second. The eggs furnished about one-fifth of the total protein and two-thirds of the total fat of the diet. Considering the average results of the whole investigation or those of each experiment, the rations containing the eggs cooked in the two ways proved equally digestible, 90 to 91 per cent of the protein and 95 per cent of the fat consumed being retained in the body. As the only factor in the experiments which varied was the time of cooking the eggs, the deduction seems warranted that the hard and soft boiled were equally digestible.

From experimental evidence it seems fair to conclude that eggs are quite thoroughly digested and that the length of time of cooking has less effect upon this factor than upon the time required for digestion. In a healthy man the latter consideration is probably not a matter of much importance. In the diet of sick persons and invalids it may be more important. Diet in such cases, however, is a matter for the attention of skilled physicians.

In some of the experiments referred to above the eggs were used alone; in others, as a part of a more or less simple mixed diet. The effect of one food upon the digestibility of another is a matter concerning which little is definitely known. It is possible that when two foods are eaten together, the digestibility of either or both is (1) unchanged, (2) increased, or (3) diminished.

Apparently no experiments have been made in which the problem was studied with special reference to eggs combined with other foods. However, artificial digestion experiments were made by Fraser on the effect of beverages on the digestibility of a number of foods including raw and cooked egg albumen, which led to the deduction that tea, coffee, and cocoa retarded somewhat the digestibility of the nitrogenous constituents of eggs, although the effect was less marked with coffee than with the other beverages. Water did not have this effect.

Though interesting in themselves, too wide application should not be made of the results of such tests, for even if the beverages retarded digestibility somewhat, it does not necessarily follow that this effect was harmful, or that the thoroughness of digestion was altered.

THE PLACE OF EGGS IN THE DIET

Eggs are used in nearly every household in some form or another in varying amounts. From the results of the numerous dietary studies, made under the auspices of this Department and by the agricultural experiment stations, it has been calculated that on an average eggs furnish 3 per cent of the total food, 5.9 per cent of the total protein, and 4.3 per cent of the total fat used per man per day. Cheese was found to furnish 0.4 per cent of the total food, 1.6 per cent of the total protein, and 1.6 per cent of the total fat, while the milk and cream together furnish 19.9 per cent of the total food, 10.5 per cent of the total protein, and 10.7 per cent of the total fat. Milk and cream together also furnish some carbohydrates, while eggs and cheese furnish no appreciable amount of this group of nutrients. Considering some of the common meats, beef and veal together were found to furnish 10.3 per cent of the total food, 24.6 per cent of the total protein, and 19.5 per cent of the total fat. The corresponding values for mutton and lamb together were 1.4, 3.3, and 3.8 per cent.

It will be seen that, judged by available statistics, eggs compared favorably with the more common animal foods, as regards both the total food material and the total protein and fat furnished by them in the average daily dietary. In other words, investigations show that the high food value of eggs is appreciated and that they constitute one of the very important articles of diet in the American household.

The amount of nutritive material which a given amount of eggs will furnish at any stated price per dozen may be readily calculated. When eggs are fifteen cents per dozen, ten cents expended for this food will furnish one pound total food material, containing 0.13 pound protein and 0.09 pound fat, the whole having a food value of 635 calories. At twenty-five cents per dozen, ten cents worth of eggs will furnish 0.60 pound total food material, supplying 0.08 pound of protein, 0.05 pound of fat, and 380 calories. At thirty-five cents per dozen, ten cents will procure 0.43 pound total food material containing 0.06 pound of protein, 0.04 pound of fat, and furnish 275 calories. Ten cents expended for beef at eight cents per pound will furnish 1.25 pounds total food material, containing 0.24 pound protein, 0.16 pound fat, and 1,120 calories. Expended for beef sirloin at twenty cents per pound it will furnish 0.05 pound total food matter, containing 0.08 pound protein, 0.09 pound fat, and 520 calories. If wheat bread is purchased at five cents per pound, ten cents will pay for two pounds of total food material containing 0.18 pound protein, 0.03 pound of fat, 1.06 pounds carbohydrates, and 2,430 calories.

In many of the dietary studies made in the United States, data were recorded of the cost of different foods and the relative amount of nutritive material contributed by each in proportion to the total cost. Compared with other foods at the usual prices, eggs at twelve cents per dozen were found to be a cheap source of nutrients; at sixteen cents per dozen, they were fairly expensive; and at twenty-five cents per dozen and over, they were very expensive. This point needs some further discussion, since the value of eggs cannot fairly be estimated solely on the basis of the amount of nutrients furnished. Eggs are also valuable for giving variety to the diet and for furnishing a light, easily digested, nitrogenous food, especially

suitable for breakfast or other light meal, an important item for those of sedentary habits.

Many families of moderate means make a practice of buying fresh meat for but one meal a day—*i. e.*, dinner, using for breakfast either bacon, dried beef, codfish, or left-over meats, etc., and for lunch or supper, bread and butter and the cold meat and other foods remaining from the other two meals, with perhaps the addition of cake and fresh or preserved fruit. It is the thrifty housekeeper, who uses all her material as economically as possible in some such way, who is likely to fall into the error of excluding eggs at higher prices almost entirely from her food supply. If her economy was directed principally to restricting the use of eggs in the making of rich dessert dishes, cake, and pastry, one might not only refrain from criticising but welcome the circumstances which necessitated the making of simple and therefore more wholesome desserts. But usually the housekeeper economizes by the more obvious method of omitting to serve them as a meat substitute.

The statement so frequently made by housekeepers that eggs at twenty-five cents per dozen are cheaper than meat is true in one sense. Not, of course, with reference to the total amount of nutrients obtained for the money expended, but because a smaller amount of money is needed to furnish the meal. That is to say, whereas at least one and one-fourth pounds of beefsteak, costing twenty-five cents, at twenty cents per pound, would be necessary to serve five adults; in many families five eggs, costing ten cents, at twenty-five cents per dozen, would serve the same number and probably satisfy them equally well. If the appetites of the family are such as to demand two eggs per person, doubling the cost, it is still 20 per cent less than the steak. Many persons eat more than two eggs at a meal, but the average number per person it is believed does not generally exceed two in most families. A hotel chef is authority for the statement that at least one-half the orders he receives are for one egg. Frequently when omelets, souffles, creamed eggs, and other similar dishes, are served in place of fried, poached, or boiled eggs or meat, less than one egg per person is used.

These statements must not be understood as advocating a free use of eggs at any price, but merely as pointing out that even at the higher prices the occasional use of eggs in place of meat need not be regarded as a luxury. This is illustrated by observations made by Miss Bevier and Miss Sprague¹ at Lake Erie College, Ohio, during a dietary study of some 115 women, most of them students. It was found that the amount and cost of certain foods required for a single meal, when any one of them was served, was as follows:

¹ U. S. Department Agriculture, Office of Experiment Stations Bulletin 91, and unpublished data furnished by Miss Sprague.

COMPARATIVE AMOUNT AND COST OF CERTAIN FOODS REQUIRED, PER MEAL, BY WOMEN STUDENTS' CLUB.

	Amount required.	Price per pound.	Total cost per meal.
	Pounds.	Cents.	
Beef steak	26	17	\$6.12
Mutton chops	45	14	6.30
Hamburg steak.	24	12½	3.00
Sausage	30	12	3.60
Bacon	12	9	1.08
Dried Beef	4	23	a .92
Eggs	b 15	c 14½	2.20
do	b 15	d 16½	2.50

a Milk, butter, and flour required for the dried beef, when creamed, would increase the cost somewhat.

b 15 pounds = 10 dozen eggs. c Or 22 cents per dozen. d Or 25 cents per dozen.

At the price at which board was furnished, steaks and chops were too expensive for use as breakfast dishes. Bacon or dried beef was considered cheap. Hamburg steak and sausage were regarded as practicable and were occasionally used. When the investigation was undertaken, the opinion was commonly held that eggs at twenty-two cents per dozen were expensive, and at twenty-five cents per dozen so dear that they could not be used, yet it will be seen by reference to the above table that at both prices the amount of eggs actually required to satisfy the members of the club cost less than any of the foods except bacon and dried beef. Observations showed that many of the students did not care for Hamburg steak or sausage and would eat eggs. If any boiled eggs were left, they could be used for garnishing salads or in other ways and therefore need not be wasted, while it was difficult to utilize the remnants of Hamburg steak or sausage in such a way that they were relished. It appears, therefore, that both as regards economy and palatability, the use of eggs in this case as a breakfast food was warranted.

In the instance cited, it is known that ten dozen eggs, thirty pounds of sausage, twenty-four pounds of Hamburg steak, twelve pounds of bacon, and the amounts of the other foods mentioned in the table, were not equivalent as regards the quantity of nutrients furnished, although any of the foods could be used as a breakfast dish in the quantity mentioned and give satisfaction to the club. It must be remembered, however, that other foods were served with the meat or eggs, and that the total amount of nutrients consumed at the meal may not have varied greatly from day to day, although the menu was quite different. Furthermore, physiologists believe that the quantities eaten each day need not conform exactly to the accepted dietary standard, but rather that the daily average throughout a considerable period must not vary very greatly from it. A deficiency on one day may be easily made good by an abundance the next. When, as was the case at Lake Erie College, each meal is abundant, the average daily diet corresponds with reasonable closeness to the commonly accepted dietary standard, and the persons consuming it have every appearance of being properly nourished, such substitutions of food of unlike nutritive value seem justifiable on theoretical as well as on practical grounds. It hardly needs to be said that the instance cited is in accord with the ordinary household practice.

Eggs and the foods into which they enter are favorite articles of diet

with very many, if not most, families, and in this as in other cases the income and the need for economy must determine how far and in what way they are to be used when they are high in price. Judged by their composition and digestibility, eggs are worthy of the high opinion in which they are usually held. Furthermore, they are generally relished. Although the physiological reason is perhaps difficult to find, it is generally conceded that the attractiveness and palatability of any food must not be forgotten in considering its true nutritive value. Refinement in matters of diet should keep pace with growth in general culture, and foods which please the esthetic sense as well as satisfy the hunger are certainly to be preferred to those which serve the latter purpose only, if they can be provided with the income at one's command.

MARKETING AND PRESERVING EGGS

In earlier times eggs, if sold at all, were marketed near the place where they were produced. Many are still sold in local markets; but with improved methods of transportation the market has been extended and large quantities of eggs are shipped from this country and Canada not only to distant points in America, but to England and more distant countries. For shipping long distances there are special egg cases, and the shipper should select the kind which is preferred in the market which he desires to reach.

The shells of new-laid eggs should be wiped clean, if necessary, and the eggs graded as regards size. In some markets brown eggs are preferred to white. It is stated that in the Boston market brown-shelled eggs, such as are laid by Partridge Cochins, Dark Brahmas, Barred Plymouth Rocks, etc., sell at from two to five cents per dozen more than white-shelled eggs, such as are laid by Brown Leghorns, Buff Leghorns, and White and Black Minorcas. In the New York market, on the other hand, white-shelled eggs bring the higher price. That the color of the shell has no relation to the food value, as shown by analysis, is pointed out on another page (p 355).

Eggs which are to be shipped, whether with or without a special attempt at preservation, should be perfectly fresh, and should never be packed in any material which has a disagreeable odor. Musty straw or bran will injure the flavor and keeping qualities of eggs packed in it. When shipped, eggs should not be placed near anything which has a disagreeable or strong odor. Keeping eggs near a cargo of apples during transportation has been known to injure their flavor and also their market value. As previously noted, micro-organisms may enter the egg through the minute pores in the shell and set up fermentation which ruins the egg. In other words, it becomes rotten. The normal eggshell has a natural surface coating of mucilaginous matter, which hinders the entrance of these harmful organisms for a considerable time. If this coating is removed or softened by washing or otherwise, the keeping quality of the egg is much diminished. If the process of hatching has begun, the flavor of the egg is also injured.

There are many ways of testing the freshness of eggs which are more or less satisfactory. "Candling," as it is called, is one of the methods most commonly followed. The eggs are held up in a suitable device against a light. The fresh egg appears unclouded and almost translucent; if incubation has begun, a dark spot is visible which increases in size according to the length of time incubation has continued. A rotten egg appears dark

colored. Egg dealers become very expert in judging eggs by testing them by this and other methods.

The age of eggs may be approximately judged by taking advantage of the fact that as they grow old their density decreases through evaporation of moisture. According to Siebel a new-laid egg placed in a vessel of brine made in the proportion of two ounces of salt to one pint of water, will at once sink to the bottom. An egg one day old will sink below the surface, but not to the bottom, while one three days old will swim just immersed in the liquid. If more than three days old, the egg will float on the surface, the amount of shell exposed increasing with age; and if two weeks old, only a little of the shell will dip in the liquid.

The New York State Experiment Station studied the changes in the specific gravity of the eggs on keeping and found that on an average fresh eggs had a specific gravity of 1.090; after they were ten days old, of 1.072; after twenty days, of 1.053, and after thirty days, of 1.035. The test was not continued further. The changes in specific gravity correspond to the changes in water content. When eggs are kept they continually lose water by evaporation through the pores in the shell. After ten days the average loss was found to be 1.60 per cent of the total water present in the egg when perfectly fresh; after twenty days, 3.16 per cent, and after thirty days, 5 per cent. The average temperature of the room where the eggs were kept was 63.8 degrees F. The evaporation was found to increase somewhat with increased temperature. None of the eggs used in the thirty-day test spoiled.

Fresh eggs are preserved in a number of ways which may, for convenience, be grouped under two general classes: (1) Use of low temperature, *i. e.*, cold storage; and (2) excluding the air by coating, covering, or immersing the eggs, some material or solution being used which may or may not be a germicide. The two methods are often combined. The first method owes its value to the fact that micro-organisms, like larger forms of plant life, will not grow below a certain temperature, the necessary degree of cold varying with the species. So far as experiment shows, it is impossible to kill these minute plants, popularly called "bacteria" or "germs," by any degree of cold; and so, very low temperature is unnecessary for preserving eggs, even if it were not undesirable for other reasons, such as injury by freezing and increased cost. According to a recent report of the Canadian commission of agriculture and dairying:

When fresh-laid eggs are put into cold storage with a sweet, pure atmosphere at a temperature of 34 degrees F., very little, if any, change takes place in their quality. The egg cases should be fairly close to prevent circulation of air through them, which would cause evaporation of the egg contents.

Eggs should be carried on the cars and on the steamships [at a temperature of] from 42 degrees to 38 degrees. When cases containing eggs are removed from the cold-storage chamber, they should not be opened at once in an atmosphere where the temperature is warm. They should be left for two days unopened, so that the eggs may become gradually warmed to the temperature of the air in the room where they have been deposited, otherwise a condensation of moisture from the atmosphere will appear on the shell and give them the appearance of sweating. This so-called "sweating" is not an exudation through the shell of the egg, and can be entirely prevented in the manner indicated.

It is stated by Siebel that in practice in this country 32 degrees to 33 degrees F. is regarded as the best temperature for storing eggs, although some American packers prefer 31 degrees to 34 degrees, while English writers recommend a temperature of 40 degrees to 45 degrees as being equally

satisfactory. The amount of moisture in the air in the cold-storage chamber has without doubt an important bearing on this point. Eggs are generally placed in cold storage in April and the early part of May. If placed in storage later than this time they do not keep well. They are seldom kept in storage longer than a year. Eggs which have been stored at a temperature of 30 degrees must be used soon after removal from storage, while those stored at 35 degrees to 40 degrees will keep for a considerable time after removal from storage, and are said to have the flavor of fresh eggs. The author cited states that eggs for market, especially those designed for cold storage, should not be washed. Stored eggs should be turned at least twice a week, to prevent the yolk from adhering to the shell.

Eggs are sometimes removed from the shells and stored in bulk, usually on a commercial scale, in cans containing about fifty pounds each. The temperature recommended is about 30 degrees F., or a little below freezing, and it is said they will keep any desired length of time. They must be used soon after they have been removed from storage and have been thawed.

The substances suggested and the methods tried for excluding air conveying micro-organisms to the egg, and for killing those already present, are very numerous. An old domestic method is to pack the eggs in oats or bran. Another, which has always had many advocates, consists in covering the eggs with limewater which may or may not contain salt. The results obtained by such methods are not by any means uniform. Sometimes the eggs remain fresh and of good flavor, and at other times they spoil. Recently, in Germany, twenty methods of preserving eggs were tested. The eggs were kept for eight months with the following results: Those preserved in salt water, *i. e.*, brine, were all bad, not rotten, but unpalatable, the salt having penetrated the eggs. Of the eggs preserved by wrapping in paper, eighty per cent were bad; the same proportion of those preserved in a solution of salicylic acid and glycerin were unfit for use. Seventy per cent of the eggs rubbed with salt were bad, and the same proportion of those preserved by packing in bran, or covered with paraffin or varnished with a solution of glycerin and salicylic acid. Of the eggs sterilized by placing in boiling water for twelve to fifteen seconds, fifty per cent were bad. One-half of those treated with a solution of alum or put in a solution of salicylic acid were also bad. Forty per cent of the eggs varnished with water glass, collodion, or shellac were spoiled. Twenty per cent of the eggs packed in peat dust were unfit for use, the same percentage of those preserved in wood ashes, or treated with a solution of boric acid and water glass, or with a solution of permanganate of potash were also bad. Some of the eggs were varnished with vaseline; these were all good, as were those preserved in limewater or in a solution of water glass. Of the last three methods, preservation in a solution of water glass is especially recommended, since varnishing the eggs with vaseline is time consuming, and treatment with limewater sometimes communicates to the eggs a disagreeable odor or taste.

Many of these methods have been tested at the agricultural experiment stations in this and other countries. The Canada Station found that infertile eggs kept much better than fertile eggs when packed in bran. In view of the fact that preservation in brine has been said to injure the eggs by giving them an unpleasant, salty taste, experiments were recently made at the Berlin University to learn the proportion of salt which entered the eggs when

placed in brine of varying strength. It was found by the investigator that with a saturated or half saturated solution, the salt entered the eggs at first very quickly, and later much more slowly. After remaining four days in the saturated solution, an egg contained as much salt as one which remained four to six weeks in a one to three per cent solution. If kept in the saturated solution four weeks, 1.1 per cent of salt was found in the yolk and 1.5 per cent in the white of the eggs. None of the eggs tested were spoiled. When a one to five per cent solution was used, the eggs kept well for four weeks and did not have a salty flavor. These instances are sufficient to show that any given method will give different results in different hands, and this is not surprising, since the eggs used are not always uniformly fresh, nor is it at all certain that other experimental conditions are uniform.

In the last two or three years the method of preserving eggs with a solution of water glass has often been tested both in a practical way and in laboratories. The North Dakota Experiment Station has been especially interested in the problem. In these experiments a ten per cent solution of water glass preserved eggs so effectually that "at the end of three and one-half months eggs that were preserved the first part of August still appeared to be perfectly fresh. In most packed eggs, after a little time, the yolk settles to one side, and the egg is then inferior in quality. In eggs preserved for three and one-half months in water glass, the yolk retained its normal position in the egg, and in taste they were not to be distinguished from fresh store eggs. Again, most packed eggs will not beat up well for cake making or frosting, while eggs from a water glass solution seemed quite equal to the average fresh eggs of the market."

Water glass or soluble glass is the popular name for potassium silicate or for sodium silicate, the commercial article often being a mixture of the two. The commercial water glass is used for preserving eggs, as it is much cheaper than the chemically pure article which is required for many scientific purposes. Water glass is commonly sold in two forms, a sirup-thick liquid, of about the consistency of molasses, and a powder. The thick sirup, the form perhaps most usually seen, is sometimes sold wholesale as low as one and three-fourths cents per pound in carboy lots. The retail price varies, though ten cents per pound, according to the North Dakota Experiment Station, seems to be the price commonly asked. According to the results obtained at this station a solution of the desired strength for preserving eggs may be made by dissolving one part of the sirup-thick water glass in ten parts, by measure, of water. If the water glass powder is used less is required for a given quantity of water. Much of the water glass offered for sale is very alkaline. Such material should not be used, as eggs preserved in it will not keep well. Only pure water should be used in making the solution, and it is best to boil it and cool it before mixing with the water glass. The solution should be carefully poured over the eggs packed in a suitable vessel, which must be clean and sweet, and if wooden kegs or barrels are used they should be thoroughly scalded before packing the eggs in them. The packed eggs should be stored in a cool place. If they are placed where it is too warm silicate deposits on the shell and the eggs do not keep well. The North Dakota Experiment Station found it best not to wash the eggs before packing, as this removes the natural mucilaginous coating

on the outside of the shell. The station states that one gallon of the solution is sufficient for fifty dozen eggs if they are properly packed.

It is, perhaps, too much to expect that eggs packed in any way will be just as satisfactory for table use as the fresh article. The opinion seems to be, however, that those preserved with water glass are superior to most of those preserved otherwise. The shells of eggs preserved in water glass are apt to crack in boiling. It is stated that this may be prevented by puncturing the blunt end of the egg with a pin before putting it into the water.

In the East Indian Archipelago salted ducks' eggs are an article of diet. The new-laid eggs are packed for two or three weeks in a mixture of clay, brick dust, and salt. They are eaten hard-boiled. It is said that in this region and in India turtle eggs are also preserved in salt. These products, while unusual, do not necessarily suggest an unpleasant article of diet. The same can hardly be said of a Chinese product which has often been described. Ducks' eggs are buried in the ground for ten or twelve months and undergo a peculiar fermentation. The hydrogen sulphid formed breaks the shell and escapes while the egg becomes hard in texture. It is said that the final product does not possess a disagreeable odor or taste. Eggs treated in this or some similar way are on sale in the Chinese quarter of San Francisco, and very likely in other American cities. A sample recently examined had the appearance of an egg covered with dark-colored clay or mud.

SELLING EGGS BY WEIGHT

Since eggs vary more or less in size it has been proposed that they should be sold by weight rather than by the dozen, which is the usual custom in this country. The North Carolina Experiment Station, in investigating this point, recorded the weight of eggs per dozen and the number produced during six months by pullets and old hens of a number of well-known breeds and by ducks. Generally speaking, larger eggs were laid by hens than by pullets of the same breed. The eggs laid by Pekin ducks (old and young) averaged 35.6 ounces per dozen, and were heavier than those laid by any breed of hens. Of the different breeds of hens tested, the largest eggs weighed twenty-eight ounces per dozen and were laid by Light Brahmas. The Black Langshan and Barred Plymouth Rock hens' eggs weighed a little over twenty-six ounces per dozen, while those laid by Single Comb Brown Leghorns, late hatched Plymouth Rock, White Wyandotte, and Buff Cochin hens ranged from 21.7 to 23.7 ounces per dozen.

Of the pullets, the heaviest eggs (weighing 26.5 ounces per dozen) were laid by the Black Minorcas, the lightest by the Single Comb Brown Leghorns and Silver-Laced Wyandottes. These weighed 17.5 and 22.1 ounces per dozen, respectively. The Barred Plymouth Rock, White Plymouth Rock, White Wyandotte, Black Langshan, and Buff Cochin pullets' eggs all weighed not far from 24 ounces per dozen. As will be seen, the variation in the weight of the eggs was considerable. In tests carried on at the Maine Experiment Station it was noticed that eggs from hens that laid the greatest number were on an average smaller in size than those from hens producing fewer eggs. The percentage of fertility was also less in the former than in the latter.

In the North Carolina test all of the eggs, regardless of size, had a local

market value of $13\frac{1}{2}$ cents per dozen at the time of the investigation. If a dozen Single Comb Brown Leghorn pullets' eggs weighing $17\frac{1}{2}$ ounces were worth $13\frac{1}{2}$ cents per dozen, or 12 cents per pound, the eggs of the other breeds would be actually worth from 16.3 cents for the Single Comb Brown Leghorn hens to 21.6 cents per dozen for the Light Brahma hens, or from 20.7 to 60 per cent in excess of their market value. The eggs of the Pekin ducks would be worth 26.7 cents, or 97.8 per cent above their market value. On the basis of the results obtained, the station advocates selling eggs by the pound instead of by the dozen. It is said that the egg packers and dealers maintain that this method would increase the cost of the eggs, owing to the extra handling necessary and the consequent breakage. An apparent objection to selling eggs by weight is that they are not generally used in the household in this way. Most recipes call for eggs by number and not by weight. There is no question that weighing the eggs would be more accurate, and recipes are occasionally met with in which this method is followed.

DESICCATED EGGS, EGG POWDERS, AND EGG SUBSTITUTES

Different methods of evaporating or desiccating eggs have been proposed and several products which claim to be prepared in this way are now on the market. It is said that the egg is dried in or out of a vacuum, usually by a gentle heat or by currents of air. When placed on the market the dried egg is usually ground. Sometimes salt, sugar, or both have been used as preservatives. As will be seen by reference to the table of composition (p. 355) such material is merely egg from which the bulk of water has been removed.

If the process of manufacture is such that the resulting product is palatable and keeps well, the value of evaporated eggs under many circumstances is evident.

This material is used by bakers to some extent as being cheaper when fresh eggs are high in price. It is also used in provisioning camps and expeditions, since desiccated foods have the advantage of a higher nutritive value in proportion to their bulk than the same materials when fresh. Fresh eggs contain about 25 per cent of dry matter. If all the water is removed in preparing evaporated eggs, one pound will furnish nutritive material equivalent to about four pounds of fresh eggs. One of the commercial egg products recently tested appeared to be dried egg coarsely ground. For use it was thoroughly mixed with a small quantity of water. The mixture could then be fried or made into an omelet, etc., and was found to be very palatable, closely resembling in taste the same dishes made from fresh eggs.

An egg substitute has been manufactured from skim milk. It is said to contain the casein and albumen of the milk mixed with a little flour, and is put up in the form of a paste or powder. Such material is evidently rich in protein and, according to reports apparently reliable, is used in considerable quantities by bakers and confectioners in place of fresh eggs.

Egg substitutes have been devised which consist of mixtures of animal or vegetable fats, albumen, starch or flour, coloring matter, and some leavening powder in addition to the mineral matters similar to those found in the egg. Such products are designed to resemble eggs in composition.

Other egg substitutes have been marketed which contain little or no albumen, but apparently consist quite largely of starch, colored more or less

with some yellow substance. These goods are specially recommended for making custards and puddings similar in appearance to those in which fresh eggs are used. There is no reason to suppose that such products cannot be made so that they will be perfectly wholesome. The fact must not be overlooked that in the diet they cannot replace fresh eggs, since they do not contain much nitrogenous matter or fat. As recently pointed out in one of the medical journals, this may be an important matter if such an egg substitute is used in the diet of invalids, especially, if the composition of the egg substitute is not known, and it is employed with the belief that, like eggs, it contains an abundance of protein.

POSSIBLE DANGER FROM EATING EGGS

Occasionally a person is found who is habitually made ill by eating eggs, just as there are those who cannot eat strawberries or other foods without distress. Such cases are due to some personal idiosyncrasy, showing that in reality "one man's meat is another man's poison." A satisfactory explanation of such idiosyncrasy seems to be lacking.

Overindulgence in eggs, as is the case with other foods, may induce indigestion or other bad effects. Furthermore, under certain conditions eggs may be the cause of illness by communicating some bacterial disease or some parasite. It is possible for an egg to become infected with micro-organisms, either before it is laid or after. The shell is porous, and offers no greater resistance to micro-organisms which cause disease than it does to those which cause the egg to spoil or rot. When the infected egg is eaten raw the micro-organisms, if present, are communicated to man and may cause disease. If an egg remains in a dirty nest, defiled with the micro-organisms which cause typhoid fever, carried there on the hen's feet or feathers, it is not strange if some of these bacteria occasionally penetrate the shell and the egg thus becomes a possible source of infection. Perhaps one of the most common troubles due to bacterial infection of eggs is the more or less serious illness sometimes caused by eating those which are "stale." This often resembles ptomaine poisoning, which is caused, not by micro-organisms themselves, but by the poisonous products which they elaborate from materials on which they grow.

Occasionally the eggs of worms, etc., have been found inside hens' eggs, as indeed have grains, seeds, etc. Such bodies were doubtless accidentally occluded while the white and shell were being added to the yolk in the egg gland of the fowl.

Judged by the comparatively small number of cases of infection or poisoning due to eggs reported in medical literature, the danger of disease from this source is not very great. However, in view of its possibility, it is best to keep eggs as clean as possible and thus endeavor to prevent infection. Clean poultry houses, poultry runs, and nests are important, and eggs should always be stored and marketed under sanitary conditions. The subject of handling food in a cleanly manner is too seldom thought of, and what is said of eggs in this connection applies to many other foods with even more force.

IMPORTANCE OF THE EGG INDUSTRY

The egg industry is of considerable commercial importance. The total number of eggs produced in the United States in 1890 was estimated to be

820,000,000 dozen, and these figures are quite often said to be too low. The United States formerly imported a large number of eggs and exported very few. The ratio has changed within the last ten years, and now the exports largely exceed the imports.

Growth of the egg industry—In 1890 the total number of eggs exported was in round numbers 381,000 dozen, worth \$59,000; in 1899, 3,694,000 dozen, worth \$641,000. In 1890 this country imported 15,000,000 dozen, worth \$2,000,000, and in 1899 only 225,000 dozen, valued at \$21,000.

Taking into account the five years up to and including 1898, 61 per cent of the exported eggs were sent to Cuba, 20 per cent to Canada, and 11 per cent to Great Britain, while the remainder was distributed among many other countries. During the same period, 96 per cent of the eggs imported came from Canada, 3 per cent from China, and the remainder from various other countries.

These statistics of the egg trade are of interest, since they show the great growth of the poultry industry, and indicate what it may become in the future. Some of the developments may be fairly attributed to the work of the government and the agricultural experiment stations. For many years a considerable number of the stations, especially these in Alabama, California, Indiana, Kentucky, Louisiana, Maine, Massachusetts, Michigan, New York, North Carolina, North Dakota, Oklahoma, Oregon, Rhode Island, South Carolina, Utah, and West Virginia, have been experimenting upon methods of feeding and caring of poultry, the comparative value of different breeds, the possibility of increasing egg production by proper feeding and the selection of laying stock, and similar problems. The station bulletins reporting the investigations have been circulated widely. These investigations are being continued and promise to be even more valuable in their results in the future than in the past. The Department of Agriculture has done much to encourage the poultry industry by collecting and distributing information,¹ and in other ways.

Poultry raising is often carried on in conjunction with general farming, and may be profitably developed along such lines. When it is followed as an independent enterprise, its possibilities are also great. There is always a market for poultry and eggs for food, while the raising of fancy stock for breeding purposes is frequently worth consideration.

¹ Farmers' Bulletins 41, 51, and 64 of the department are devoted exclusively to poultry topics. A number of Farmers' Bulletins of the series entitled "Experiment Station Work" contains short articles on poultry, poultry feeding, or similar topics. A bibliography of poultry literature has been published by the Department Library (Bul. 18). Bulletin 5, of the Division of Publications contains a list of references to articles on eggs and poultry in the Department publications. A number of the publications of the Bureau of Animal Industry contain articles on poultry diseases, egg production, and other topics, while many of the publications of the Section of Foreign markets give statistics of the poultry and egg industry.

XXV

SOME SANITARY ASPECTS OF MILK SUPPLIES AND DAIRYING*

BY SEVERENCE BURRAGE

This subject of public milk supplies is not a new one. It has been generally known for some time that milk and butter may be, and often are adulterated, and the legislature, by the enactment of laws, have in several cases protected the citizens against this fraud. But a far more serious fact from the sanitary standpoint is this: that milk and butter are commonly polluted, containing filth and foreign materials which are more or less dangerous to the health. Infected milk has frequently carried the germs of disease and caused severe epidemics. This paper has been written for the purpose of attracting attention to this bacteriological side of the subject, to show its importance to community life, and by the diffusion of facts to make it possible to blot out in the near future some of the dangers that now exist.

The following figures, taken from the eleventh United States census, will show the importance of the dairying industry in our State:

Production of milk in Indiana for 1889,	-	200,510,797	gallons.
Production of butter	"	"	- - 48,477,776 pounds.
Production of cheese	"	"	- 360,948 pounds.

†Figuring at eight cents a gallon for milk, ten cents a pound for butter, and five cents a pound for cheese, gives a total value of \$20,906,687.76.

These figures have undoubtedly increased considerably since 1889, and could the corresponding figures be obtained for 1895 they would give a much more striking illustration of the value of dairying to the commonwealth.

It is certainly possible to raise the general standard of dairying throughout the State. Much trouble arises from the ignorance or carelessness of the milkmen. If they are uncleanly in their habits, if they do not take the proper care of their own bodies, and of the cattle and stable, they add an important factor toward making serious and dangerous conditions. The more unfavorable these conditions, just so much more is the chance that the milk will depart from the normal.

NORMAL MILK

Cow's milk is essentially an animal secretion, the direct product of certain glands, whose function it is to manufacture this liquid food for the calf while it is too young to partake of the more solid food. The milk is secreted

*Permission to reprint has been kindly granted by Purdue University, Department of Sanitary Science, located at Lafayette, Indiana. Monograph No. 2.

†These prices were suggested by Prof. C. S. Plumb, Director of the Purdue Agricultural Experiment Station.

by these mammary glands, the cells of which actually contribute a certain portion of their own substance that they have manufactured from the blood. Thus we find stored in the udder a liquid made up largely of real animal substance, a rich food material suitable for human use. The chemical composition of milk will not be touched upon, as the proportions of its various constituents have little to do with the problems at hand. Suffice it to say, that this white, innocent looking liquid which is such an excellent food for the human family, is likewise a most fertile soil for various minute plants, micro-organisms belonging to one of the lowest divisions of the vegetable kingdom, scientifically known as "Bacteria."

It has been shown that milk in the udder of a perfectly healthy cow is absolutely free from bacteria or germs of any kind; in other words, it is sterile or germ-free. If the milk could be used when first drawn from the cow, as was done by people in a more primitive or patriarchal state, who domesticated many of the milk-giving animals, as the cow, goat, mare, and camel, this object, viz.: germ-free milk, would be partly attained. They did not have to store the milk for any length of time, nor did they have to transport it from one place to another, but in the modern civilized community real fresh milk is seldom obtained. It is delivered several hours after milking, and it often has to pass through several different handlings before it is placed upon the table for consumption. Therefore, it is not surprising that we rarely find normal milk in city households.

COMMERCIAL MILK IS NOT NORMAL MILK

It has been proven that normal milk in the healthy cow's udder is free from bacteria. City milk, on the other hand, shows an entirely different condition. It is swarming with bacteria. The average number of bacteria in fifty-seven samples of milk taken in Boston, in the spring of 1890, was 2,355,500 per cubic centimeter, a quantity equal to a small thimbleful. In some fifteen samples, taken in the suburbs of Boston, from the tables of well-to-do families, whose milkmen were exceptionally good, the average number of bacteria per cubic centimeter was 69,143. American cities appear to have better milk from a bacterial standpoint than European cities. In the latter, milk seldom contains less than 5,000,000 per cubic centimeter. In the milk supply of Middletown, Connecticut, the number of bacteria was found to be comparatively low. In this case the milk is delivered to the consumer within a few hours of milking, as it does not have to be sent on an extended railroad journey, as ordinary city milk often does. The bacteria varied from 11,000 to 300,000 per cubic centimeter. •

An examination of milk made at the end of a milking under the usual conditions, viz.: wide pail, and a more or less shaking of the udder during the process, showed an average of 30,500. Other figures might be given, showing the number of bacteria in the milk supplies of cities and towns, foreign and American, all showing that commercial milk had departed from the normal condition. It contains myriads of vegetable organisms. The examples cited above are sufficient to give an idea of the large numbers and will serve better as a demonstration than a long table of figures.

MAJORITY OF BACTERIA IN MILK ARE HARMLESS

All bacteria are not disease germs. A very small proportion of them are dangerous or harmful in any way. In this way they may be compared to

the larger and more familiar forms of the vegetable kingdom, which can be seen every day in the field, the forest, and the garden. Here are hundreds of trees, shrubs, and plants, nearly all perfectly harmless, but there are some ten or fifteen forms, including the poison ivy (*Rhus toxicodendron*) and the poison oak (*Rhus venenata*), both poisonous to the touch, and spotted cow-bane (*Cicuta maculata*), and wild carrot (*Daucus Carota*), poisonous to eat, and have to be avoided. Just so it is with these minute bacteria. There are countless species that are perfectly harmless, and many are exceedingly useful. At the same time several dangerous disease-producing forms exist, causing such diseases as diphtheria, Asiatic cholera, and typhoid fever, which are much more to be dreaded than the poisons of the more familiar plants mentioned above. The conditions, moreover, which favor the growth of the harmful forms are usually favorable for the more dreaded ones, also, just as in the case of the higher plants. Of the enormous number of bacteria found in milk, cited on previous pages, it is possible that none were pathogenic, or disease producers, and would not in any way harm the public health. The fact remains true that where these harmless or non-pathogenic bacteria thrive it is possible for the dangerous ones to thrive also. It is believed by some authorities that the large number of bacteria existing in milk may have an important relation to the high death-rate among children under five years of age, as will be discussed on another page.

Many of the common phenomena, as putrefaction and fermentation, are due to some of these minute organisms. The souring of milk will occur only when the lactic acid bacteria are present. If milk could be kept absolutely free from any contamination—from contact with any germs—it could be preserved indefinitely. All canning and preserving of fruits and vegetables is based upon this principle. The materials are cooked thoroughly, the high temperature killing all the germs; the cans are then sealed while still hot, and the air, always laden with spores of bacteria and molds, does not have access to the preserves. Consequently, if properly sealed, they should last indefinitely. Any means by which the milk can be protected from these germ-spores in the air must necessarily lengthen the time that the milk will keep fresh; and any method, such as cooling immediately after milking, thus retarding the growth of the organism, would give a similar result.

SOURCES OF BACTERIA IN MILK

(a) *In the Barn and Vicinity* If the normal milk in the udder of the cow is sterile, the first opportunity for bacteria to reach it would be during the operation of milking. It must be borne in mind that the bacteria are omnipresent, being in the air and soil, and particularly where dampness, dust, and dirt exist. Ordinary dust is made up of many spores of bacteria and molds, and it is evident that the conditions existing in a barn where cows are kept must be most favorable for the production of such dust. All animal refuse contains bacteria, and there is of necessity much such filth about the barn or stable, and even about the cows themselves, unless they are unusually well-kept. In order to show how many opportunities are afforded the milk to become contaminated, it will be instructive to follow closely the operation called milking, the usual method of drawing the milk from the udder.

If it is in the morning, the man starts from the house perhaps without having washed himself, takes the milk pail, which is supposed to be clean, opens the barn, seats himself on a stool near the cow to be milked, and holding the milk pail between his knees, he seizes the teats with more or less violence, and proceeds to fill the pail. With the shaking of the udder, the switching of the cow's tail, and the possible rubbing of the cow's sides by the hat or head of the milker, much disgusting material is often dropped into the pail; in fact, the following impurities have been found in unstrained fresh milk:

Manure particles (numerous), fodder particles (which have not passed the alimentary canal of the animals), molds and other fungi, cow hair (numerous), particles of the skin, human hair, parts of insects, down from birds, small wooden pieces, shavings, and pieces of fir-leaves, woolen threads, linen threads, soil particles (rather frequent), and moss particles, fine threads (most likely cobwebs), etc.

Admitting that many of these coarser materials are strained out before the milk is delivered to the consumer, nevertheless, the bacteria that were on them would remain in the milk, and finding a warm rich soil, would increase most rapidly. The example given above is supposed to be carried out under average circumstances, but if we imagine the milkman or farm hand to be untidy about the care of himself, the barn and the herd of cows, it is not difficult to imagine that a much worse state of affairs might exist, and a great deal more filth of the most disagreeable kind be found in the milk. It sometimes happens that a farmer is careful about the care of his barn, and just before milking he conscientiously takes the precaution to sweep the floor and stalls most carefully. He has obviously chosen the worst possible time to do this, for he has stirred up the dust and dirt so that it will settle into the pail, onto the cow and onto himself; consequently much of this dust stirred up by his sweeping is likely to reach the milk. Many men will moisten the hands with the milk, as this makes the operation easier for them. Unless their hands, and the cow's udder and teats are unusually clean this is an exceedingly unfortunate practice.

These illustrations, although very familiar to many of us, indicate clearly that under the most favorable circumstances, with the best conditions of barn, of men and of surroundings, it is only too easy for the milk to become an unpleasantly dirty food. This operation of milking seldom if ever occupies less than five minutes, and in that time, with the activity and stir within the vicinity of the pail, there would naturally much of the ordinary dust settle. It will not be required to further emphasize the fact that the barn and stable are the principal sources of bacteria in milk.

(b) *On the Road to the Consumer* Much milk, especially city milk, has to travel a considerable distance before reaching the consumer, the journey sometimes taking several hours. During this time it is subjected to various temperatures, seldom low enough to in any way retard the growth of the organisms. In many places where it is transported by railroad, particularly in cities of the Eastern United States, ice is so extensively used that the numbers of bacteria are comparatively low; but if the milk cans have to stand upon the depot platform in the sun, as often happens; if the milk has to be changed from one set of cans to another, the chances are enhanced that the number of bacteria will be greatly increased. The effect of this is clearly

demonstrated in milk which has been cooled directly after milking, such milk keeping fresh many hours after that which has been hurried directly from milking to the consumer. It has been observed that afternoon milk keeps much longer than morning's milk, which may be explained in this way, there being much more hurry and carelessness in the early morning.

It not infrequently happens that certain circumstances arise, after the milk leaves the barn or the place of milking, which allow water to be added to the milk. Whether this be premeditated or not is out of the province of this paper to discuss, as it has been the purpose here to emphasize the contamination and pollution and not the adulteration of milk. It is an interesting fact, however, that milk to which water has been added contains, as a rule, less bacteria than ordinary milk. The reason for this is apparent. The food is a more dilute one and the bacteria will not multiply as rapidly in it, and the addition of water presumably containing not as many bacteria will lessen the number ordinarily found in the straight milk. But there is a danger right here that must be carefully guarded against. This water, although containing comparatively few bacteria, may have come from a contaminated well; it may contain the germs of disease, particularly typhoid fever, as will be seen on a subsequent page. These facts illustrate that the journey of the milk from the barn to the consumer is often a productive source of bacteria, and sometimes of dangerous ones.

(c) *In the Dwelling of the Consumer* The house of the consumer, as a source of bacteria in milk, depends largely upon the habits of the family and servants with special reference to cleanliness. Milk pans and cans are difficult things to clean thoroughly. If the housewife or servant is at all careless some of the milk will remain lodged in the angles, and bacteria falling upon this, encouraged by the warm temperature of the kitchen, will flourish, awaiting the addition of fresh milk. The consumer's family should set a good example to the milkman by always returning to him the can or cans perfectly clean.

(d) *Diseased Cows, Farm Hands, and Milkmen* In all previous illustrations it has been taken for granted that the cows have been healthy ones; that the farmer and his help have not been diseased in any way, and that the men afterwards handling or delivering the milk have been in perfect health. In the case of the cows, statistics seem to indicate that there is a far larger proportion diseased than has been generally supposed. Many cows suffering from tuberculosis appear even to the veterinarian to be in good health, thus making it difficult to separate the diseased cows from the healthy ones. Today, however, this has been partially remedied by the introduction of the tuberculin test, which seems to indicate without fail the animals suffering from this disease. It has been demonstrated conclusively that the bacillus tuberculosis, the germ of the disease, has been found in the milk of the diseased cow, particularly if the udder is affected. It may happen that these germs get into the milk from the dust of the barn as often as they do directly from the animal itself. But the fact remains that the milk of tuberculosis cows is apt to contain the germs of the disease.

In regard to the persons that handle the milk after it leaves the cow, if they have suffered, or are suffering, from some sickness or disease, it is more than likely that some excretions or secretions from their bodies will reach the milk, unless they are exceedingly careful about their own personal cleanli-

ness. This source of bacteria would include to a great extent the sickness in families of these handlers or deliverers of the milk; particularly if they had any care of the sufferer, or even access to the sick-room. It occasionally happens that the class of people who handle the milk are careless and uncleanly in their habits, and, if they are sick, it is not probable that they will be more careful, but rather the reverse; hence, the dangers to the public are greatly increased.

We have seen heretofore that milk as sold in cities and towns contains a large number of bacteria. Taking into account these various sources of filth and foreign matters, as the barn and its surroundings, the handling of the milk on the road to the consumer, and the affected animals and men, it is almost a miracle that the milk is fit to drink at all.

INFECTED MILK AND THE PUBLIC HEALTH

It has been understood for several years by scientists and physicians that certain diseases are caused by minute vegetable organisms—bacteria—either directly by the presence of the bacteria cells themselves obstructing the normal action of the organs of the body (as tuberculosis), or indirectly by the poisons, ptomaines, secreted by the bacteria as products of their growth (as diphtheria).

A specific germ or bacterium can produce a certain disease in the animal body, and that same germ will always be found in the body of the person or animal suffering from that same disease; that germ will not be found in the body suffering from any other disease, and by the introduction of that germ into the healthy body, only that same disease will be produced.

The bacteria are the scavengers, the cleansers of the earth's surface. They are essential to the farmer in the working over of the soil, as also in the manufacture of butter. Pure cultures of certain forms of bacteria known to give an especially desirable flavor to the butter are distributed among the dairies today, and it is not improbable that pure cultures of other bacteria, which are peculiarly active in the soil, will soon be distributed around to the farmers who are having more or less difficulty with their fields and crops. It is through the agency of these bacteria that the organic manures and fertilizers are worked over into inorganic, less complex mineral substances, which are essential to the life of the plants.

It has been shown heretofore that large numbers of bacteria are found in milk; that some of these are harmless and some harmful, but there is much evidence that disease has been actually spread through the agency of milk.

(a) *Probable Relations of Milk to Infant Mortality* To those familiar with the vital statistics of the State or Nation it must have been a noticeable fact that the death rate of children under five years of age was remarkably high. For the benefit of some who may not have had access to the figures, a table from the eleventh United States census is given below, showing the comparative death rate per 1,000 of the living population of corresponding ages for both white and colored in the registration States as a whole, in the cities and in the rural portion.

SUM OF REGISTRATION STATES *

ITEMS.	White.			Colored.		
	Total.	Under 1 year.	Under 5 years.	Total.	Under 1 year.	Under 5 years.
Population	12,442,940	261,247	1,256,504	951,407	24,090	122,114
Deaths	244,442	59,335	86,034	18,619	4,807	7,345
Rate	19.65	227.12	68.47	19.57	199.54	60.15

CITIES IN REGISTRATION STATES

Population	7,026,697	154,454	718,565	227,837	4,486	19,836
Deaths	163,184	45,912	65,697	7,865	2,534	3,504
Rate	23.22	297.25	91.43	34.52	564.87	176.65

RURAL PORTION OF REGISTRATION STATES

Population	5,416,243	106,793	537,939	723,570	19,604	102,278
Deaths	81,256	13,423	20,337	10,754	2,273	3,841
Rate	15.00	125.69	37.81	14.86	115.95	37.55

These data are taken from the registration States, in which we would expect to get fairly accurate statistics, and they show clearly the high death rate among infants, and particularly among those children confined to the cities.

In Indiana, as well as in other States, about one-third of all the deaths are of those under five years of age, and this would be a much higher rate in the city districts than in the country districts.

The principal food of the child is milk. A large proportion of children today are bottle-fed, and this proportion is increasing, especially in the cities; and it is in the cities that the worst conditions exist in regard to procuring pure fresh milk. City milk contains millions of bacteria, many of which, during their process of growth in the milk, have produced ptomaines, or poisons, which might not affect us as adults, but without doubt do materially affect the health of the young child, whose system has not had time to become accustomed to the poison, and therefore cannot react against it. It is a well-known fact that the animal body can accustom itself to doses of poison, which doses, if given at first, would cause serious illness and perhaps death, but starting with easy, light doses, the system may get used to it. Smokers are good examples of animal bodies getting accustomed to a poison. They are oftentimes made sick when smoking their first two or three pipes, but after that the poison seems to have no immediate effect on the system. In this way the modern infant has to take a great many chances in starting its earthly career.

Dr. Mary A. Willard is quoted in the February (1896) "Popular Science Monthly" as follows:

"When the poor, pinched, blue, weazened little creatures were brought to me in the dispensary in New York, where they used to come by the dozen. I would call for their nursing bottles, take a whiff of their sour, putrid contents, swarming with bacteria, pull off the rubber nipple and the ivory guard, rip up the long tube with my penknife, and scrape off the green, poisonous matter, tyrotoxicon, and spread it out on my palm before the astonished mother."

* Page 6, Compendium of Eleventh Census, Part II.

This statement shows the necessity of great care on the part of the mothers and nurses. If they are not able to feed the babies themselves, and consequently have to resort to cow's milk, they should at least take every precaution to have that milk fresh and pure.

Admitting that there are several important causes combining to make the infant mortality so high, especially in the cities, where the crowded conditions, poor air, bad drainage, etc., all must have their effect upon the child's organization, yet the poor milk which is practically the only food given the child in the first months of its life must be a most important factor in swelling the number of children's diseases and deaths.

Whether or not there is some one form of bacterium that does more than any other may be for some time yet a doubted question. The cause of many cases of sickness among children lies with more probability upon the enormous number of germs that have been swarming, growing, and secreting their poisons in the milk for several hours, rather than upon any one species of a more pathogenic nature.

*Lesage claims that bacillus coli communis, the common intestinal bacillus, becomes virulent in milk, aided by the higher temperature, and has caused epidemics of infantile diarrhoea.

An epidemic of diarrhoea among infants broke out after the establishment of a brewery in a certain district in France. Brewers' grains are evidently injurious when kept till they are sour and fermenting. (Handbook of Hygiene and Sanitary Science. Wilson, p. 76). Another case of diarrhoea caused by milk is reported by Dr. Henry Ashby, Manchester, England, in the London Lancet, January 19, 1895. Dr. V. C. Vaughan, of the University of Michigan, has shown how the tyrotoxin, produced by the bacteria in milk, cheese, ice cream, custards, etc., may be the cause of many cases of sudden sickness, and especially cholera infantum. Dr. Vaughan, under the title "Infection of Meat and Milk," says: "The infection of milk is one of the most serious questions, etc., * * * and constitutes one of the most important factors in the causation of infantile mortality."

(b) *Milk and Typhoid Fever* In dealing with the question of milk as a cause of typhoid fever epidemics, there is a great deal of positive evidence, and much of it from sources which should leave no doubt as to the value of the facts. Dr. S. W. Abbott, Secretary of the Massachusetts State Board of Health, says:² "A great many typhoid epidemics, like those of Caterham and Plymouth, and also in multitudes of smaller epidemics which have occurred in connection with private water supplies and milk supplies, the chain of evidence, although rarely completed by the finding of the typhoid bacillus en route, as one might, from the ilium of the sick to the oesophagus of the well, whether by the medium of a glass of water, or a cup of tea, coffee, or any other drink in which either milk or water is used, is such as could rarely fail to produce conviction in the minds of a jury of experts."

The following cases of typhoid fever traced to polluted milk are reported from England: Dr. Ballard³ records an epidemic of enteric fever as occurring at Islington in 1870. Mr. Power,⁴ of Ratcliffe, one in 1873 at Maryle-

* Norveaux Elements d'Hygiene. Arnold p. 486.

¹ Transactions Internat. Congress Hygiene. Vol. VII.

² American Public Health Ass'n Proceedings. Vol. XVI, p. 37.

³ Local Government Reports, 1885. V.

⁴ Mr. Simon's Reports, New Series, No. II.

bone, London. In 1881 Mr. Ernest Hart* collected information regarding fifty epidemics of enteric fever, fifteen of scarlet fever, and seven of diphtheria, which were traced to milk poisoning. Twenty-two of these typhoid fever epidemics were due to the addition in some way of polluted water. Prof. Davies,† of the Army Medical School at Netley, Hampshire, England, studied nineteen epidemics of enteric fever and eighteen of scarlet fever due to infected milk since 1881. Dr. Goldie‡ describes an epidemic of enteric fever which broke out in Leeds, England, on June 27, 1889, traced to milk as cause.

Dr. Vincent,¹ physician to Geneva Board of Health, records and describes an epidemic of typhoid fever at that place in the spring of 1890. Dr. Robinson,² of Dover, England, related a case in which he thought the milk supply was polluted by typhoid poison by absorption. Dr. A. Campbell Munro³ describes an outbreak of enteric fever in Shawland, near Glasgow, Scotland, in August, 1891, apparently caused by milk polluted with bad water. Another enteric fever epidemic is reported by Dr. Phillip Boobyer,⁴ at Nottingham, England, in his annual report for 1890. Prof. Gaffky describes (in *Deutsch Med. Woch.*) three recent outbreaks of enteric fever⁵ traced to milk supplies, and Dr. P. Q. Karkeek,⁶ at Torquay, England, in his annual report, writes of an outbreak of typhoid fever due to the consumption of milk from a farm situated outside his own district.

Here are given eighty epidemics of typhoid or enteric fever (all of which are outside of the United States) traced to milk as the cause or vehicle of the disease, and the above list by no means includes all.

In regard to similar epidemics in this country there are several remarkably good examples. Massachusetts furnishes three notable ones, viz.: Springfield,⁷ Somerville,⁸ and Marlboro,⁹ and Connecticut one, at Stamford.¹⁰ The Springfield epidemic originated at an outlying farm which supplied a portion of the milk to the man on whose route the cases were more than suspiciously distributed. The Somerville outbreak was caused apparently by the milk becoming infected in a milk-house, where the milk was mixed or "set-up;" and in Marlboro and Stamford it was in both cases due to infected skim milk. In all these cases there was sickness either on the farm or among those who handled the milk.

(c) *Milk and Diphtheria* The evidence that diphtheria has been transmitted by means of milk is by no means as clearly demonstrative as in the case of typhoid fever. There have been several cases, however, that have seemed to have more or less connection with the inflammatory condition of the udder. Mr. Power¹⁰ reports a case of this kind in 1878; another in Octo-

* Transactions International Medical College (1881). Vol. IV, p. 391.

† Provincial Medical Journal, 1889.

‡ Lancet, July 13, 1889.

¹ Lancet, October 4, 1890.

² Lancet, August 15, 1891.

³ Public Health, June, 1892.

⁴ Public Health, January, 1892.

⁵ American Public Health Association Reports, Vol. XVIII, p. 305.

⁶ Lancet, March 9, 1895.

⁷ Mass. State Board of Health Report, 1892.

⁸ Mass. State Board of Health Report, 1894.

⁹ Lancet, June 1, 1895. Report State Board of Health, Conn., 1895.

¹⁰ Report of Local Government Board, 1878.

ber, 1886, at Yorktown;¹ Dr. Masou,¹ in the autumn of 1888, another at Barking; and, in 1890, Dr. Philpot¹ another at Croyden. Dr. Coleman,² of the Urban Sanitary District of Surbiton, describes an outbreak in December, 1891. Dr. W. N. Thursfield³ reports other cases coincident with a disease among cows. But the facts in regard to such epidemics caused by milk, while showing the possibility, do not show that there is very much danger from this source.

(d) *Milk and Scarlet Fever* Dr. Buchanan's report to the Local Government Board in 1886-7, concludes that the famous "Hendon disease" is a form, occurring in the cow, of the very same disease that we call scarlatina in the human subject. Although this has been contested since by veterinarians and bacteriologists, nevertheless it has been proved that certain diseased conditions of the cows have caused outbreaks of scarlet fever in those using milk from or coming in contact with such cows.

Prof. Crookshank⁴ believed the above Hendon case was caused by human infection, and not by the diseased cows. Such evidence as the following, however, will prove that milk may carry the scarlet fever contagion: Fifteen cases were reported by Mr. Ernest Hart,⁵ as given on a previous page; one by Dr. Parsons⁶ in February, 1889, at Macclesfield and Upton, England; one by Mr. Limmick,⁷ Medical Officer of Health at Crosby, near Liverpool, and one by Dr. A. Campbell Munro,⁸ in August, 1891, Medical Officer of Health in the County of Renfrew, England.

Dr. D. S. Davies,⁹ Medical Officer of Health at Bristol, England, reports one in 1891, in which the disease originated from workers on the farm; another* is reported at Leyton, Essex, in September, 1892; Dr. Scarlyn Wilson,[†] Medical Officer of Hastings, England, records one due apparently to diseased cows, in his annual report for 1893; and Dr. Shirley Murphy[‡] describes one in Blackheath, Greenwich, and Lee, England, in March, 1894, in which the milk did not probably receive infection directly from human agencies, but from diseased cows. Dr. Robert Saundry[§] makes a statement in writing to the editor of "Lancet" that scarlet fever and diphtheria are frequently conveyed by milk. Other authorities could be quoted as showing the probable connection between diseased cows and scarlet fever and scarlatina, but it will not be necessary to further weary the reader with such statistics.

(e) *Milk and Tuberculosis* Tuberculosis is now considered as one of the contagious diseases. It is particularly dangerous as it works so slowly and insidiously. Milk is probably one of the great distributors of the germs of

¹ Transactions International Congress of Hygiene and Demography, 1891. "Infectious Udder Diseases of the Cow in Relation to Epidemic Diseases in the Human Subject."

² Public Health. Feb., 1892, p. 158.

³ Public Health. Feb., 1892, p. 130.

⁴ International Congress of Hygiene and Demography, 1891.

⁵ Transactions International Medical Congress, 1881. Vol. IV.

⁶ Local Gov't Board Report, 1889.

⁷ Lancet, June 14, 1890.

⁸ Second Annual Report of Med. Officer Health of County of Renfrew.

⁹ Davies Annual Report for 1891. (Public Health, Sept., 1892.)

* Lancet, Sept. 24, 1892.

† Lancet, April 21, 1894.

‡ Lancet, Aug. 25, 1894.

§ Lancet, Feb. 25, 1893.

the disease, as this same disease is exceedingly common among cattle. It has been proved that the tubercle bacilli are often, but not always, found in the milk of tuberculous cows, even if there be no lesion of the udder. It is very difficult to prove, however, that the tuberculous milk causes consumption or tuberculosis in the consumer of the milk. Dr. Karl Hirschberger,³ requested by Dr. Bollinger, states, on the strength of his experiments, that the danger of infection from the milk of tuberculous cows, does not only exist, but is very great, the bacilli being found in 55 per cent, of all cases examined. The more the tuberculosis has spread, the greater the danger, but even in mild cases of localized tuberculosis, the milk is more or less infectious. Wilson⁴ is authority for the following in regard to the dangers attaching to the tuberculous infection of milk, basing his opinions on these facts: The bacilli of bovine tuberculosis are identical with those found in the human organs, although the disease presents different characters in man and cattle, and the experiments of Martin, Galteir, and Bang of Copenhagen, proved that milk which was found to contain tubercle bacilli, produced the disease either by ingestion when injected into the peritoneum of guinea pigs, or by inoculation: and this also applies to cream, butter, and whey⁴.

The experiments of Dr. L. Heim⁵ show that the tubercle bacilli in milk may produce the disease; that these bacilli may live for three days in decomposable substances; that milk to which tubercle bacilli had been added was after ten days still infectious, but not so in four weeks, especially if decomposition had taken place in the meantime. In butter the vitality of the bacilli lasted four weeks, and in whey and cheese were able to communicate the disease for a fortnight, and remained visible for thirty-two days.

As about one-seventh of all deaths in the human family are due to tuberculosis in some form, it can be readily understood how important it is to check any factor which may be helping along this unseen enemy. Tuberculous cows and carelessness in stables where tuberculous cows are kept, are the two great loopholes for the germs to reach the milk, and whether or not we can state an actual proof that the germ in the milk has caused the disease in man, the germ is there, and therefore the chance exists, and the possible results are too serious to allow of much experimentation.

The work of the Cattle Commissioners of Massachusetts has been quite extensive, and valuable results obtained. To those interested in the subject we would recommend "A Handbook on Tuberculosis Among Cattle," compiled by Henry L. Shumway. (Roberts Bros., Boston, 1895.)

(f) *Milk and Other Diseases* A disease at one time common in the Western and Southern States, a severe gastro-intestinal disorder, collapse, fever, etc., was brought on by using milk from cows suffering from the acute febrile disease called "tumbles."* In man it was known as milk-sickness, and Dr. Beach, of Ohio, estimates that twenty-five per cent of western pioneers and their families died of this disease.

The foot and mouth disease is reported from England by Dr. Thorne† and Dr. Paine,† at Cardiff, and a cholera‡ epidemic is described as caused

³ Lancet, Aug. 3, 1890.

⁴ Wilson. Handbook of Hygiene and Sanitary Science, p. 83.

⁵ Laboratory of German Imperial Health Department.

*Text-Book of Hygiene. George H. Rohe, M. D. 1894.

†Wilson. Hand-Book of Hygiene, p. 83.

‡Walter Voight. A Chapter on Cholera for Lay Readers, p. 38.

by infected milk on board the ship *Ardenclutha*, in Calcutta harbor, the milk having had water added to it from an infected well.

CONCLUSION

The science of bacteriology has thrown a new light upon this question of dairying and public milk supplies. New dangers confront the citizen as the communities increase in size. Instead of having his own well for drinking water, and his own cow for milk, he is obliged to get the water from a public source, and his milk from a man supplying several families. In this paper it has been the object to show that milk, as it is handled by a majority of people today, carries with it a certain element of danger against which the people should guard themselves. In many States a very careful watch is kept upon the adulteration of milk and dairy products,—thus the citizens are protected somewhat from fraud. Very little has been done, however, towards protecting the public against the possible infection of the milk by such elements as typhoid fever germs, tuberculosis, cholera, diphtheria, and scarlet fever. If milk is adulterated one does not get what he pays for, and the modern business man cannot stand being cheated; therefore inspectors are appointed to protect him against such outrageous frauds. On the other hand, he subjects to the chances of having all the above mentioned diseases, not only himself, but his whole family, who are liable, as far as public protection is concerned, to be carried off by one of these infectious diseases. It shows plainly that the general public has not yet become awakened to the serious nature of the question. It does not stand to reason that they would lay themselves open to these dangers did they understand the importance to themselves, their families, and the public, of greater watchfulness and care.

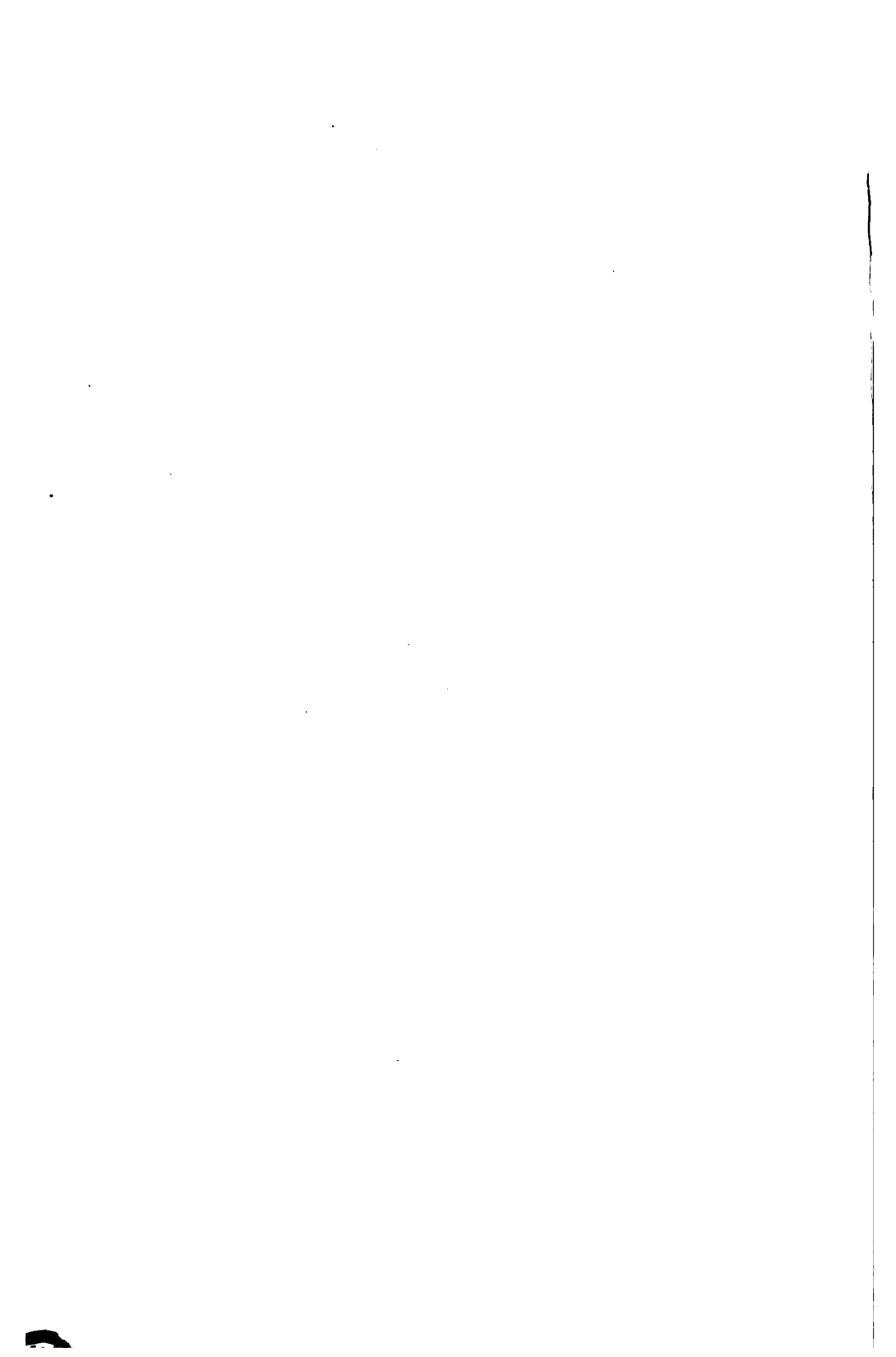
Dr. Thompson, of New South Wales, says that a milkman who is careless should be regarded and treated as a public enemy, for should an epidemic break out as a result of his negligence, it involves not only loss and suffering, but a heavy pecuniary charge results from the necessary hospital care and treatment; all this besides consequences of the death of the individuals.

From the standpoint of the milkman, if his milk is found to be below the required standard, he should not look upon the inspector as trying to injure his business, for it is the object of the public health authorities to improve it, and the better the milk the better sale it will have, and the better reputation the man will have also.

In the cities they should have not only milk inspectors, but dairy and farm inspectors who know good conditions from bad ones, who are not influenced by political or personal obligations, and who will conscientiously perform the duties given to them. These men should be backed by a vigorous, wide-awake public sentiment, which realizes that the best results are obtained when the milkmen and dairymen are working in co-operation with the health officials.

Laws Relating to the Public Health and Safety

Compiled from the Code, and from the Acts of the
Twenty-seventh and Twenty-eighth
General Assemblies



XXVI

STATE BOARD OF HEALTH

CHAPTER 16, TITLE XII

SECTION 2564. The state board of health shall consist of the attorney-general and the state veterinary surgeon, who shall be members by virtue of their offices, one civil engineer and seven physicians, to be appointed by the governor, each to serve for a term of seven years and until his successor is appointed; vacancies to be filled by the governor for the unexpired term. But no one of the seven physicians hereafter appointed shall be an officer or member of the faculty of any medical school, and the governor shall have the power to remove any member of said board for good cause shown. It shall meet semi-annually in May and November, and at such other times as it may decide upon, such meetings to be held at the seat of government; suitable rooms [office supplies and furniture, except postage and stationery*] therefor to be provided by the custodian of the capitol. At the meeting held in May, a president from their number, and a secretary who shall be a physician not of their number, shall be elected, and the latter have an office in the capitol.

SEC. 2565. The board shall have charge of and general supervision over the interests of the health and life of the citizens of the state; matters pertaining to quarantine, registration of marriages, births and deaths; authority to make such rules and regulations and sanitary investigations as it from time to time may find necessary for the preservation and improvement of the public health, which, when made, shall be enforced by local boards of health and peace officers of the state. It shall prepare and furnish, through its secretary, to the clerks of the several counties such forms for the record of marriages, births, and deaths as it may determine upon, and by its secretary make biennial reports to the governor, which shall include so much of its proceedings, such information concerning vital statistics, such knowledge respecting diseases, and such instruction upon the subject of hygiene, as may be thought useful for dissemination among the people, with such suggestions as to further legislation as may be thought advisable.

SEC. 2566. It shall be the duty of all assessors, at the time of making assessment, to obtain and report to the clerk of the district court, upon blanks adopted by the state board of health and furnished by the county auditor, such registration of births and deaths as occur within their respective districts for the year ending December 31st immediately preceding.

SEC. 2567. The clerk of the court in each county shall keep a book in which shall be recorded all marriages occurring within the county, together

* As amended by the Twenty-seventh General Assembly, Chapter 67.

with such data respecting the same as shall be required by the state board of health, and shall report to the secretary of the state board of health on or before the first day of June in each year such data respecting such marriages for the year ending December 31st immediately preceding. The clerk of the district court of each county shall keep a book in which shall be recorded all births and deaths occurring within the county as shown by the returns filed in his office by the assessor, as provided in section 2566; and on or before the first day of June in each year shall furnish to the secretary of the state board of health a report of such births and deaths.

SEC. 2568. The mayor and council of each town or city, or the trustees of any township, shall constitute a local board of health within the limits of such towns, cities or townships of which they are officers. The town, city or township clerk shall be clerk of the local board, which board shall appoint a competent physician as its health officer, who shall hold office during its pleasure. It shall regulate all fees and charges of persons employed by it in the execution of health laws and its own regulations and those of the state board of health; have charge of all cemeteries dedicated to public use not controlled by other trustees or incorporated bodies, and the burial of the dead; make such regulations as are necessary for the protection of the public health respecting nuisances, sources of filth, causes of sickness, rabid animals and quarantine, not in conflict with any regulations of the state board of health, which shall also apply to boats or vessels in harbors or ports within their jurisdiction; to proclaim and establish quarantine against all infectious or contagious diseases dangerous to the public, and maintain and remove the same, as may be required by regulations of the state board; may, when satisfied upon due examination that any cellar, room, tenement building, or place occupied as a dwelling or otherwise has become, or is by reason of the number of occupants, uncleanness or other cause, unfit for such purpose, or a cause of nuisance or sickness to the occupants or the public, issue a notice in writing to such occupants or any of them, requiring the premises to be put in proper condition as to cleanliness, or requiring the occupants to remove or quit such premises within a reasonable time to be fixed; and, if the persons so notified or either of them neglect or refuse to comply therewith, may by order cause the premises to be properly cleaned at the expense of the owner or owners, or may forcibly remove the occupants and close the premises, and peace and police officers shall execute such orders, which premises so closed shall not be again occupied as a dwelling place without written permission of the board. The quarantine authorized by this section in case of infectious or contagious diseases may be declared or terminated by the mayor of any city or town, or the township clerk outside of such city or town, in cases required by regulations of the state board of health, upon written notice given by any practicing physician of the existence of such disease, or termination of the cause for quarantine, as the case may be.

SEC. 2569. The local board may with its physician, when of the opinion it is necessary for the preservation of the lives or health of the inhabitants, enter a building, vessel or place for the purpose of examining into, preventing, removing or destroying any nuisance, source of filth or cause of sickness, and, in case its members or physician shall be refused such entry, make complaint through any member under oath to any magistrate of the county,

whether a member of the board or not, stating the facts so far as known, and the magistrate shall thereupon issue his warrant, directed to any peace officer of the county, commanding him between the hours of sunrise and sunset, accompanied by two or more members of the board, to prevent, remove or destroy such nuisance, source of filth or cause of sickness, which shall be executed by the officer under the direction of such members of the board, and it may order the owner of any property, building or place to remove at his own expense, within twenty-four hours, or such other time as may be fixed by it, after notice has been served upon such owner, occupant or other person in charge thereof, any nuisance, source of filth or cause of sickness found thereon, and if such person fails or neglects to comply with the order and make such removal, it may cause the same to be done at the expense of the owner or occupant.

SEC. 2570. When any person shall be infected, or shall have been recently infected, or sick with smallpox or other disease dangerous to the public health, whether a resident or otherwise, it may make such provisions as are best calculated to preserve the inhabitants against danger therefrom, by removing such person to a separate house, when it may be done without injury to his health, and provide nurses, needful assistance and supplies, which shall be charged to the person, or those liable for his support, if able; if unable, it shall be done at the expense of the county. If such person cannot be removed, he shall be cared for in the same manner as in cases of removal with like results as to charges therefor, and in addition it may cause the people in the neighborhood to remove from the vicinity of the infected house, and take any and all other needed action to insure the safety of the citizens. The removal or care of infected persons, as herein provided, shall be effected by an application made to a civil magistrate in the manner provided for the removal and abatement of nuisances, who shall issue his warrant, as directed in such cases, requiring the officer to remove such person, or take possession of condemned houses or lodgings, and provide nurses, attendants and other necessities for the care, safety and relief of the sick, which warrant shall be executed under the direction of the board of health.

SEC. 2571. Local boards of health shall meet for the transaction of business on the first Mondays of April and October in each year, and at such other times as may seem necessary. They shall give notice of all regulations adopted, by publication thereof in some newspaper printed and circulated in the town, city or township, or, if there is none, by posting a copy thereof in five public places therein, and through their physician or clerk shall make general report to the state board at least once a year, and special reports when it may demand them, of its proceedings and such other facts as may be required, on blanks furnished by and in accordance with instructions from it. All expenses incurred in the enforcement of the provisions of this chapter, when not otherwise provided, shall be paid by the town, city or township; in either case all claims to be presented and audited as other demands. In the case of townships, the trustees shall certify the amount required to pay such expenses to the board of supervisors of the county, and it shall advance the same, and, at the time it levies the general taxes, shall levy on the property of such township a sufficient tax to reimburse the county, which, when collected, shall be paid to and belong to the county.

SEC. 2572. Local boards of health shall obey and enforce the rules and

regulations of the State Board; and peace and police officers within their respective jurisdictions, when called upon to do so by the local boards, shall execute the orders of such board.

SEC. 2573. Any person being notified to remove any nuisance, source of filth or cause of sickness, as in this chapter provided, who fails, neglects or refuses to do so after the time fixed in such notice, or knowingly fails, neglects or refuses to comply with and obey any order, rule or regulation of the State or local board of health, or any provision of this chapter, after notice thereof has been given as herein provided, shall forfeit and pay the sum of twenty dollars for each day he refuses such obedience, or for each day he knowingly fails, neglects, or refuses to obey such rule or regulation, or knowingly violates any provision of this chapter, to be recovered in an action in the name of the clerk of the board, and, when collected, to be paid to the clerk of the town, city or township, as the case may be, and for its benefit; and, in addition thereto, anyone so offending, or knowingly exposing another to infection from any contagious disease, or knowingly subjecting another to the danger of contracting such disease from a child or other irresponsible person, shall be liable for all damages resulting therefrom, and guilty of a misdemeanor.

SEC. 2574. The secretary of the state board of health shall receive such salary as the board shall fix, not to exceed twelve hundred dollars yearly, payable upon the certificate of the president to the state auditor, who shall issue his warrant for the amount due upon the state treasurer. Each member of the board shall receive only actual traveling and other necessary expenses incurred in the performance of his duties, such expenses to be itemized, verified, certified, audited, and a warrant drawn therefor in the same manner as the secretary's salary.

SEC. 2575. The sum of five thousand dollars or so much thereof as may be necessary, is annually appropriated to pay the salary of the secretary, expenses of the board, contingent expenses of the secretary's office, and all costs of printing; all such contingent and miscellaneous expenses to be itemized, verified, certified audited, and paid as other expenses of the board.

PUBLIC HEALTH DISTRICT

CHAPTER 88, LAWS TWENTY-EIGHTH GENERAL ASSEMBLY

SECTION 1. *Districts—vacancies—how filled.* That section two thousand five hundred sixty four (2564) of the Code be, and the same is hereby amended by adding thereto the following:

"For the purposes contemplated in this section the state shall be divided into health districts, numbered and consisting respectively of the counties named as follows:

DISTRICT No. 1.—Allamakee, Butler, Bremer, Blackhawk, Buchanan, Chickasaw, Clayton, Delaware, Fayette, Floyd, Grundy, Howard, Mitchell, Winneshieek.

DISTRICT No. 2.—Benton, Cedar, Clinton, Dubuque, Iowa, Jones, Jackson, Johnson, Linn, Muscatine, Scott.

DISTRICT No. 3.—Appanoose, Davis, Des Moines, Henry, Jefferson, Keokuk, Louisa, Lee, Mahaska, Monroe, Wapello, Washington, Van Buren.

DISTRICT No. 4.—Cerro Gordo, Calhoun, Emmet, Franklin, Hancock, Humboldt, Hamilton, Hardin, Kossuth, Pala Alto, Pocahontas, Webster, Winnebago, Worth, Wright.

DISTRICT No. 5.—Buena Vista, Cherokee, Clay, Dickinson, Ida, Lyon, Osceola, O'Brien, Plymouth, Sioux, Sac, Woodbury.

DISTRICT No. 6.—Audubon, Adair, Cass, Crawford, Carroll, Greene, Guthrie, Harrison, Monona, Pottawattamie, Shelby.

DISTRICT No. 7.—Boone, Dallas, Jasper, Marshall, Madison, Marion, Polk, Story, Tama, Poweshiek, Warren.

DISTRICT No. 8.—Adams, Clarke, Decatur, Fremont, Lucas, Mills, Montgomery, Page, Ringgold, Taylor, Union, Wayne.

When vacancies occur in the state board of health, it shall be the duty of the governor to appoint to membership on the board physicians residing in the various health districts, until seven such districts are represented on the board. After which time the annual appointment shall be made from the physicians residing in the district not represented on the Board the preceding year."

OF THE PRACTICE OF MEDICINE

CHAPTER 17, TITLE XII

SECTION 2576. *Board of medical examiners—examinations—certificates.*—

The state board of medical examiners shall consist of the physicians of the state board of health, and the secretary of the board of health shall be secretary thereof. It shall hold regular meetings in May and November and special ones as may be necessary, due notice thereof being given, at which it shall discharge the duties contemplated by this chapter. All examinations shall be in writing, each candidate for examination in any school of medicine being given the same set of questions, covering anatomy, physiology, general chemistry, pathology, surgery and obstetrics. In materia medica, therapeutics and the principles and practice of medicine, a set of questions shall be used corresponding to the school of medicine which the applicant desires to practice. The examination papers, when concluded, shall be marked upon the scale of one hundred, each candidate for examination first to pay to the secretary of the board a fee of *ten dollars therefor. The average required to pass shall be fixed by the board prior to the examination. Each applicant shall, upon obtaining an order for examination, receive from the secretary a confidential number which he shall place upon his work when completed, so that the board, in passing thereon, shall not know by whom it was prepared. All matters connected therewith shall be filed with

* As amended by the Twenty-eighth General Assembly, chapter 89.

the secretary and preserved for five years as a part of the records of the Board, during which time they shall be open to public inspection. If the examination is satisfactory to five members of the board, it shall issue its certificate, under its seal, signed by its president, secretary, and not less than three other members, who may, in the absence of the others, act as an examining board, and the different schools of medicine represented in the board of health shall be represented in said number. The certificate, while in force, confers upon the holder the right to practice medicine, surgery and obstetrics, and be conclusive evidence thereof. †(Graduates from legally authorized medical schools, which in the opinion of the board are of good standing, holding genuine diplomas therefrom, upon presentation of the same, accompanied by a fee of five dollars, and such proof as may be required touching the genuineness and ownership of the diploma and the character and standing of the school issuing it, shall be by the board granted certificates, signed as above provided, conferring the right to practice as under certificates issued upon examination). In all examinations made or proceedings had pursuant to the provisions of this chapter, any member of the board may administer oaths and take testimony in any manner authorized by law. Any one failing in his examination shall be entitled to a second one, within three months thereafter, without further fee. If any person shall by notice in writing apply to the secretary of the board for an examination or re-examination, and it fails or neglects for three months thereafter to give him the same, he may, notwithstanding any provision of this chapter, practice medicine until the next regular meeting of the board without the required certificate.

SEC. 2577. *Recording certificates.* Every certificate issued under this chapter shall show whether it was granted upon examination or diploma, and the school of medicine the holder practices under. He shall, before engaging in the practice of medicine, file the same for record in the office of the recorder of the county in which he resides, who shall record it in a book provided for that purpose, which record shall be open to public inspection, and for which service the recorder may charge a fee of fifty cents, to be paid by the certificate-holder. The same record must be made of the certificate in any county to which the holder may remove and in which he proposes to practice.

□: SEC. 2578. *Refusal of certificate—revocation.* The board of medical examiners may refuse to grant a certificate to any person otherwise qualified, who is not of good moral character, and for like cause, or for incompetency, or habitual intoxication, or upon satisfactory evidence by affidavit or otherwise that a certificate had been granted upon false and fraudulent statements as to graduation or length of practice, may revoke a certificate by an affirmative vote of at least five members of the board, which number shall include one or more members of the different schools of medicine represented in said board; nor shall the standing of a legally chartered medical college, from which a diploma may be presented, be questioned, save by a like vote. After the revocation of a certificate, the holder thereof shall not practice medicine, surgery or obstetrics in the State.

SEC. 2579. *Who deemed practitioner.* Any person shall be held as practicing medicine, surgery or obstetrics, or to be a physician, within the

† Repealed by the Twenty-eighth General Assembly, chapter 89.

meaning of this chapter, who shall publicly profess to be a physician, surgeon or obstetrician, and assume the duties, or who shall make a practice of prescribing or of prescribing and furnishing medicine for the sick, or who shall publicly profess to cure or heal; but it shall not be construed to prohibit students of medicine, surgery or obstetrics, who have had not less than two courses of lectures in a medical school of good standing, from prescribing under the supervision of preceptors, or gratuitous service in case of emergency, nor to prevent the advertising, selling or prescribing natural mineral waters flowing from wells or springs, nor shall it apply to surgeons of the United States army or navy, nor of the marine hospital service, nor to physicians or midwives who have obtained from the board of examiners a certificate permitting them to practice medicine, surgery or obstetrics without a diploma from a medical school or examination by the Board, nor to physicians, as defined herein, who have been in practice in this State for five consecutive years, three years of which time shall have been in one locality, nor to filling prescriptions by a registered pharmacist, nor to the advertising and sale of patent or proprietary medicines.

SEC. 2580. *Penalties.* Any person who shall present to the board of medical examiners a fraudulent or false diploma, or one of which he is not the rightful owner, for the purpose of procuring a certificate as herein provided, or shall file, or attempt to file, with the recorder of any county in the state the certificate of another as his own, or who shall falsely personate any one to whom a certificate has been granted by such board, or shall practice medicine, surgery or obstetrics in the state without having first obtained and filed for record the certificate herein required, and who is not embraced in any of the exceptions contained in this chapter, or who continues to practice medicine, surgery or obstetrics after the revocation of his certificate, is guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than three hundred dollars, nor more than five hundred dollars and costs of prosecution, and shall stand committed to the county jail until such fine is paid; and whoever shall file or attempt to file with the recorder of any county in the state the certificate of another with the name of the party to whom it was granted or issued erased, and the claimant's name inserted, or shall file or attempt to file with the board of medical examiners any false or forged affidavit of identification, shall be guilty of forgery.

SEC. 2581. *Itinerant physician.* Every physician practicing medicine, surgery or obstetrics, or professing or attempting to treat, cure or heal diseases, ailments or injuries by any medicine, appliance or method, who goes from place to place, or from house to house, or by circulars, letters or advertisements solicits persons to meet him for professional treatment at places other than his office at the place of his residence, shall be considered an itinerant physician; and any such itinerant physician shall, in addition to the certificate elsewhere provided for in this chapter, procure from the State board of medical examiners a license as an itinerant, for which he shall pay to the treasurer of state, for use of the state of Iowa, the sum of two hundred and fifty dollars per annum. Upon payment of this sum, the Secretary shall issue to the applicant therefor a license to practice within the State, as an itinerant physician, for one year from the date thereof. The board may, for satisfactory reasons, refuse to issue such license, or may cancel such license upon satisfactory evidence of incompetency or gross immorality.

Any person practicing medicine as an itinerant physician, as herein defined, without having procured such license shall be guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than three hundred dollars nor more than five hundred dollars and costs, and shall be committed to the county jail until such fine is paid: *provided*, however, that nothing herein shall be construed to prevent any physician otherwise legally qualified from attending patients in any part of the State to whom he may be called in the regular course of business, or in consultation with other physicians.

SEC. 2582. *Examination and diploma required.* From and after January 1, 1899, all persons beginning the practice of medicine in the state of Iowa must submit to an examination as set forth in this chapter, and, in addition thereto, shall present diplomas from medical colleges recognized as in good standing by the state board of medical examiners, and all persons receiving their diplomas subsequent to January 1, 1899, shall present evidence of having attended four full courses of study of not less than twenty-six weeks each, no two of which shall have been given in any one year.

(The state board of medical examiners shall examine the graduates of the medical departments of the state university of Iowa and of such other medical colleges in this State as are recognized by said board of medical examiners as being in good and legal standing at the annual medical commencement and at the location of said state university and other medical colleges respectively.)¹

SEC. 2583. *Fees--Compensation.* Each member of the board of examiners shall receive, out of the fund created by the payment of fees by applicants for examination or certificates, the sum of eight dollars for each day, and necessary traveling expenses, for the time he is actually engaged in the discharge of his duties as a member of the board, and the secretary shall receive (a sum not to exceed twenty-five (\$25.00) dollars per month and) his necessary expenses incurred for services which cannot be performed at the capitol. (All printing, postage, and other contingent expenses necessarily incurred under the provisions of this chapter shall be paid from said fund.)² Any balance of said funds remaining shall be turned over to the state treasurer for the use of the school fund.

OF THE PRACTICE OF OSTEOPATHY

CHAPTER 69, LAWS TWENTY-SEVENTH GENERAL ASSEMBLY

SECTION 1. Any person holding a diploma from a legally incorporated and regularly conducted school of osteopathy of good repute as such, and wherein the course of study comprises a term of at least twenty months or four terms of five months each, in actual attendance at such school, and shall include instructions in the following branches, to-wit: Anatomy, physiology, chemistry, histology, pathology, gynecology, obstetrics and theory and practice of osteopathy, shall upon the presentation of such diploma

¹As amended by the Twenty-eighth General Assembly, Chapter 89.

²As amended by Chapter 90, Twenty-eighth General Assembly.

⁴As amended by the Twenty-seventh General Assembly, Chapter 65.

to the state board of medical examiners and satisfying such board that they are the legal holders thereof, shall be granted by such board, a certificate permitting such person to practice osteopathy in the state of Iowa, upon payment to said board of a fee of twenty dollars, which certificate shall be recorded by the county clerk of the county in which the holder desires to practice, for which he shall receive a fee of one dollar.

SEC. 2. The certificate provided for in the foregoing section shall not authorize the holder thereof to prescribe or use drugs in his practice, nor to perform major or operative surgery.

SEC. 3. Any person who, for the purpose of securing such certificate shall falsely represent himself or herself to be the legal holder of any such diploma, shall be deemed guilty of a misdemeanor, and on conviction be fined not less than fifty nor more than one hundred dollars.

SEC. 4. Any such certificate may be revoked by the state board of health upon satisfactory proof of fraudulent misrepresentation in procuring the same or for any violation of the provisions of the certificate, and for any gross immorality by the holder thereof.

SEC. 5. The system, method or science of treating diseases of the human body commonly known as osteopathy is hereby declared not to be the practice of medicine, surgery or obstetrics within the meaning of section twenty-five hundred and seventy-nine (2579), title twelve (xii), chapter seventeen (17) of the Code.

RELATING TO BODIES FOR MEDICAL PURPOSES

CHAPTER 129, LAWS TWENTY-EIGHTH GENERAL ASSEMBLY

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. *Repealed.* That section forty-nine hundred and forty-six (4946) of the Code be and the same is hereby repealed, and the following enacted as a substitute therefor.

SEC. 2. *Bodies for medical purposes—how distributed.* Every coroner, undertaker, superintendent, or managing officer of any public asylum, hospital, poor house, or penitentiary in this state, shall deliver the bodies of uninterred deceased persons in his charge suitable for scientific purposes with the consent of the friends or relatives, if known, and without such consent if not known, to medical colleges or schools within the State, for the purpose of scientific medical study, unless the deceased person expressed a desire during his last illness that his body should be buried or cremated; such bodies shall be equitably distributed among the medical colleges and schools in the state under such rules and regulations as may be adopted by the state board of health, and the number so distributed shall be in proportion to the number of students matriculated at each medical college or school. The expense of such distribution shall be paid by the medical college or school receiving the bodies. If there shall be more bodies than are required by the medical colleges or schools of the State, the same may be delivered to physicians in the state, under such rules and regulations as may be adopted by the state board of health.

SEC. 3. *Duties of various officers.* It shall be the duty of every such coroner, undertaker, superintendent or managing officer of a public asylum, hospital, poor house or penitentiary, as soon as any such body shall come into his custody, or as soon as any person shall die, whose body, under the provisions hereof, should be delivered to a medical college or school, to at once notify the secretary of the state board of health by telegram of the fact, and to hold such body unburied for forty-eight hours thereafter, and to deliver the body to such medical college or school as the Secretary of the state board of health may direct. If, however, such body is subsequently claimed by any relative or friend, it shall be at once, by the person or persons having the same in charge, or by the medical college or school to which it has been delivered, surrendered to such relative or friend for burial.

SEC. 4. *Body held subject to claim.* Every medical college or school, or person receiving the body of any deceased person under the provisions hereof, shall hold the same for the period of sixty days, subject to the claim of relatives or friends.

SEC. 5. *Penalties.* Any coroner, undertaker, superintendent or managing officer of any public asylum, hospital, poor house or penitentiary within this state into whose hands the body of a deceased person shall come, which should be delivered to a medical college or school under the provisions hereof, who shall willfully neglect or refuse to notify the secretary of the state board of health of the existence of such body, or refuse to deliver the same to a medical college or school upon the direction of the Secretary of the state board of health, as herein provided, shall be guilty of a misdemeanor, and upon conviction thereof be fined any sum not exceeding fifty dollars; and any person who shall receive or deliver any body or remains knowing that any of the provisions of this act have been violated, shall be imprisoned in the penitentiary not more than two years, or fined not exceeding twenty-five hundred dollars, or both.

Approved April 16, 1900.

PRACTICE OF VETERINARY MEDICINE, SURGERY AND DENTISTRY

CHAPTER 93, LAWS OF THE TWENTY-EIGHTH GENERAL ASSEMBLY

SECTION 1. *Unlawful practice.* That it shall be unlawful for any person to practice veterinary medicine, surgery, or dentistry in this state, who shall not have complied with the provisions of this act.

SEC. 2. *Existing practitioners—certificates of registration.* Any person who has practiced the profession of veterinary medicine, surgery, or dentistry in this state for a period of five years immediately preceding the passage of this act may be deemed eligible to registration as an existing practitioner and receive a certificate of registration upon presentation to the secretary of the board of veterinary medical examiners, which shall be hereinafter constituted, his sworn affidavit and letters of recommendation from ten reputable freeholders and stock owners in his locality, all such applications to be made on or before January 1st, 1901.

SEC. 3. *Graduates.* Any person who is a graduate of a legally chartered

and authorized veterinary college or veterinary department of any university or agricultural college, at the time of the passage of this act, or who shall hold a diploma from such institutions prior to 1901, shall be entitled to registration as an existing practitioner upon the presentation of his diploma, duly verified.

SEC. 4. *State board of veterinary medical examiners—term—vacancies.*

The governor of the state shall appoint a board of examiners within sixty days after the passage of this act; said board to be known as the state board of veterinary medical examiners. This board shall consist of three qualified veterinarians, residents of the state, each of whom shall be a graduate of a legally chartered and authorized veterinary college or veterinary department of any university or agricultural college, and who shall be of good standing in the profession. One of these members shall be appointed for one year; one for two years; and each succeeding appointment shall be for three years. Each shall hold office until his successor is duly appointed and qualified. No member of any veterinary college or veterinary department of the state university or agricultural college, or any person connected therewith, shall be eligible to appointment upon said board. The governor shall fill any vacancy which shall occur on the board, and may remove any member of said board for continued neglect of duty, for incompetency, unprofessional, or dishonorable conduct.

SEC. 5. *Powers of board.* This board shall have power to make all needed regulations for its government and proper discharge of its duties in accordance with this act, and shall have power to administer oaths, and take testimony concerning all matters within its jurisdiction.

SEC. 6. *Meetings.* The meetings of the examining board shall be held at least once a year, or at such times and places as it may elect. At any meeting of the board, a majority shall constitute a quorum to transact business, or to conduct examinations.

SEC. 7. *Certificate of qualification.* Said board shall receive applications for registration, according to sections two and three of this act, and shall issue a certificate of qualification to all applicants who conform to the requirements for such registration, signed by the members of the board, provided that the certificate thus granted specifically and plainly states whether or not the one to whom it is granted is a graduate or non-graduate in veterinary medicine. Such certificate shall be conclusive as to the rights of the lawful holder of the same to practice veterinary medicine, surgery, or dentistry in this State.

SEC. 8. *Registration fee.* The fee for registration shall be five dollars (\$5), payable in advance to the secretary or the board.

SEC. 9. *Qualifications—examination—fee—license.* From and after January 1st, 1901, any person not authorized to practice veterinary medicine, surgery, and dentistry in this state, and desiring to enter upon such practice, shall be a graduate of a legally chartered and recognized veterinary college or veterinary department of a university or agricultural college, and shall pass the examination required by said state board of veterinary medical examiners. The fee for such examination shall be fifteen dollars (\$15) payable in advance to the secretary of the board. The applicant shall be at least twenty-one years of age and of good moral character. Any person conforming to these requirements, and eligible to practice under section two

hereof, shall receive a license to practice veterinary medicine, surgery, or dentistry within this State, signed by the members of the board, which license shall be recorded in the office of the recorder of the county in which such person resides, the recording fee to be paid by holder of certificate.

SEC. 10. *Register—treasurer to hold fees—bond—vouchers.* The board shall keep a register of all registered practitioners in the state, setting forth such facts as the board shall see fit. All fees accruing under this act shall be held by the treasurer of the board, who shall execute good and sufficient bond to said board to faithfully discharge his duties, and who shall pay out such funds, only, on vouchers, certified by a majority of said board.

SEC. 11. *Compensation—expenses.* Each member of said board shall be entitled to receive five dollars (\$5) per diem, also actual and necessary traveling expenses, incurred while actually engaged in the discharge of his official duties, provided such compensation and expenses do not exceed said income of fees accruing under this act.

SEC. 12. *Penalty.* Any person violating any of the provisions of this act shall be guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars, or by imprisonment in the county jail for a period of not more than thirty days for each and every such offense. It shall be the duty of the county attorney of the county in which violation occurs to conduct all proceedings against violators of this act.

SEC. 13. *Exceptions.* Nothing in this act shall be construed to apply to commissioned veterinarians in the United States army or to persons who dehorn cattle, or castrate domestic animals, or to persons who gratuitously treat diseased animals.

SEC. 14. *Further penalty.* Any person who shall, without having been authorized so to do legally, append any veterinary title to his name, or shall assume or advertise any veterinary title in such manner as to convey the impression that he is a lawful practitioner of veterinary medicine or any of its branches, shall be guilty of a misdemeanor, and punished according to the provisions of section twelve (12) of this act.

SEC. 15. *Re-examination.* In case the examination of any person shall prove unsatisfactory and his name be not registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months next thereafter, and no charges shall be made for re-examination.

SEC. 16. *Board to render an account to executive council.* The board shall render under oath annually on January first to the executive council an account of all fees collected and per diem expenses paid, and pay over the balance into the state treasury.

Approved May 5, 1900.

THE PRACTICE OF DENTISTRY

CHAPTER 91—(LAWS 28TH G. A.)

Be it enacted by the General Assembly of the State of Iowa:

SECTION 1. *Repealed.* That chapter nineteen (19) of title twelve (12).

of the Code be and the same is hereby repealed, and the following enacted in lieu thereof:

SEC. 2. *Board of examiners—how appointed—term.* The board of dental examiners shall consist of five practicing dentists, who shall have been engaged in the continuous practice of their profession in this State for the period of five years preceding their appointment, one of whom shall be appointed annually by the governor, and hold office for the term of five years from and after the first day of August following his appointment, and until his successor is appointed. The Iowa State Dental Society shall, at the request of the governor, submit a list of dentists of recognized ability, from which he may select the member of the board to be appointed. All vacancies occurring in the board shall be filled in like manner, and the appointee hold office for the unexpired term of his predecessor. All members of the present board shall continue in office under this act until the expiration of their respective terms of office.

SEC. 3. *Officers—meetings—quorum.* The board shall organize by selecting one of its members as president, and one as secretary and treasurer, and shall meet at least once each year, and at such other times as it may deem necessary, and at such place as it may select. A majority of the board shall constitute a quorum, and its meetings shall at all reasonable times be open to the public.

SEC. 4. *Examinations—license—record books—fees.* The board shall at any regular meeting, and may at any special meeting, examine applicants for license to practice dentistry as to their knowledge and skill in dental surgery, and shall issue to such applicants as are found to be qualified a license authorizing them to practice dentistry. The license shall be signed by each member of the board, attested by the president and secretary, and have the seal of the board affixed thereto; and shall be presumptive evidence of the right of the holder to practice dentistry in the state. The name, age, nativity, location, number of years of practice of the person to whom a license is given, the number of the license, and the date of the registration thereof shall be entered in a book kept in the office of the secretary of the board, which shall be open to the inspection of the public, under proper restrictions as to its safe keeping, and the number of the book and page containing such entries shall be noted on the face of the license. Each applicant for a license shall be a graduate of a reputable dental school, which is recognized as such by the board of dental examiners, and pay to the board a fee of twenty dollars before a license is issued.

SEC. 5. *Testimony—rules and regulations.* The board shall have authority to take testimony in relation to all matters within its jurisdiction, and the presiding officer thereof, or of any committee appointed thereby, may issue subpoenas for, and administer oaths to, witnesses called to testify before the board or such committee; and it may make and adopt all necessary rules, regulations and by-laws not inconsistent with law necessary to enable it to perform the duties and transact the business authorized and required by this act.

SEC. 6. *Treasurer to give bond.* The treasurer shall, on assuming the duties of his office, file with the secretary of state, a good and sufficient bond in the penal sum of one thousand dollars, conditioned for the faithful discharge of his duties; and shall keep a full and accurate account of all

moneys received by him under the provisions of this act, and pay out the same upon the written order of the president countersigned by the secretary.

SEC. 7. *Compensation.* Each member of the board shall receive the sum of five dollars for each day he is actually engaged in the duties of such office, with the actual expenses incurred by him in the discharge of his duties, and the treasurer shall receive a salary not exceeding three hundred dollars per annum for his services as secretary and treasurer, which amounts shall be paid out of the fund received by the board under the provisions of this act, and from no other fund or source.

SEC. 8. *Biennial report—auditing committee.* The board shall make a biennial report to the governor of its proceedings, including a full and accurate account of all monies received and disbursed, and the president shall appoint an auditing committee consisting of three practicing dentists of the state who are not members of the board, whose duty it shall be to audit the accounts of the board annually, and make a full report thereof, which report shall accompany the biennial report made by the board to the governor. Any sum of money, remaining after the payment of the compensation and expenses of the members of the board and the salary of the secretary and treasurer, shall be by the treasurer paid into the state treasury on or before the first day of May of each year.

SEC. 9. *License filed with clerk of district court—fee.* Every person to whom a license is issued under this act shall file the same with the clerk of the district court in the county in which he desires to practice dentistry, and the clerk of the court shall be entitled to charge a fee of twenty-five cents for filing such license; and a failure to so file such license within one year after the same was issued by the board shall work the forfeiture thereof.

SEC. 10. *Penalty.* It shall be unlawful for any person to practice dentistry in this state without having complied with the provisions of this act, and any person who shall violate the provisions thereof shall be deemed guilty of a misdemeanor, and upon a conviction shall be punished by a fine not exceeding two hundred dollars or imprisonment in the county jail not more than forty days, or by both such fine and imprisonment.

SEC. 11. *Who not eligible to appointment on board.* No member of a dental college faculty, or no person connected therewith, shall be eligible to an appointment upon the state board of dental examiners.

SEC. 12. *Provisions as to physicians, dental students and registered practitioners.* Nothing herein shall be construed to prevent physicians and surgeons from extracting teeth in the practice of their profession, or to prevent *bona fide* students of dentistry, in the regular course of their instruction, from operating upon patients at clinics, or under the supervision and in the presence of their preceptors, but no fee or salary for such operations shall be received, either directly, or indirectly, by any such student of dentistry. And nothing herein shall be construed to prohibit the practice of dentistry in this state by any practitioner who has been duly registered in accordance with the laws of Iowa existing prior to the passage of this act; or any person who is a member of an incorporated society or community and practicing dentistry solely for and among the members of such community or incorporated society without charge or compensation.

OF STATE VETERINARY SURGERY

CHAPTER 14, TITLE XII, CODE

SECTION 2529. The state veterinary surgeon shall be appointed by the governor, subject to removal by him for cause, who shall hold office for three years. He shall be a graduate of some regularly established veterinary college, skilled in that science, and shall be by virtue of his office a member of the state board of health.

SEC. 2530. He shall have supervision of all contagious and infectious diseases among domestic animals in, or being driven or transported through, the state, and is empowered to establish quarantine against animals thus diseased, or that have been exposed to others thus diseased, whether within or without the state, and, with the concurrence of the state board of health, may make such rules and regulations as he may regard necessary for the prevention and suppression, and against the spread, of said disease or diseases, which rules and regulations, the executive council concurring, shall be published and enforced, and in the performance of his duties he may call for the assistance of any peace officer.

SEC. 2531. Any person who wilfully hinders, obstructs or resists said veterinary surgeon, his assistants, or any peace officer acting under him or them, when engaged in the duties or exercising the powers herein conferred, or violates any quarantine established by him or them, shall be guilty of a misdemeanor.

SEC. 2532. Said surgeon shall biennially make a full and detailed report of his doings since his last report to the governor, including his compensation and expenses, which report shall not exceed one hundred and fifty pages of printed matter.

SEC. 2533. Whenever a majority of any board of supervisors or township trustees, or any city or town council, whether in session or not, shall in writing notify the governor of the prevalence of, or probable danger from, any of said diseases, he shall notify the veterinary surgeon, who shall at once repair to the place designated in said notice and take such action as the exigencies may demand, and the governor may, in case of emergency, appoint a substitute or assistants with like qualifications, and with equal powers and compensation.

SEC. 2534. Whenever in the opinion of the state veterinary surgeon the public safety demands the destruction of any stock, the same may be destroyed upon the written order of such surgeon, with the consent of the owner, or upon approval of the governor, and by virtue of such order such surgeon, his deputy or assistant, or any peace officer, may destroy such diseased stock, and the owner thereof shall be entitled to receive its actual value in its condition when condemned, to be ascertained and fixed by the state veterinary surgeon and the nearest justice of the peace, who, if unable to agree, shall call upon the nearest or other justice of the peace upon whom they agree as umpire, and their judgment shall be final when the value of the stock, if not diseased, would not exceed twenty-five dollars; but in all other cases either party shall have the right of appeal to the district court, but such appeal shall not delay the destruction of the diseased animals. The veterinary surgeon shall at once file with the governor his written report

thereof, who shall, if found correct, endorse his finding thereon, whereupon the auditor of state shall issue his warrant therefor upon the treasurer of state, who shall pay the same out of any moneys at his disposal under the provisions of this act, but no compensation shall be allowed for stock destroyed while in transit through or across the state, and the word "stock," as herein used, shall be held to mean cattle, horses, mules and asses.

SEC. 2535. The governor, with the veterinary surgeon, may co-operate with the government of the United States for the objects of this chapter, and the governor may accept and receipt for any moneys receivable by the state under the provisions of any act of congress which may at any time be in force upon this subject, and pay the same into the state treasury to be used according to the act of congress and the provisions of this chapter as nearly as may be.

SEC. 2536. There is annually appropriated out of any moneys, not otherwise appropriated, the sum of three thousand dollars or so much thereof as may be necessary, for the uses and purposes herein set forth.

SEC. 2537. Any person, except the veterinary surgeon, called upon under the provisions of this chapter, shall be allowed and receive two dollars per day while actually employed.

SEC. 2538. When engaged in the discharge of his duties, the veterinary surgeon shall receive the sum of five dollars per day and his actual expenses, the claim therefor to be itemized, verified, accompanied with written vouchers, and filed with the state auditor, who shall allow the same and draw his warrant upon the treasury therefor.

DISEASED ANIMALS

CHAPTER 11, TITLE XXIV CODE

SEC. 5012. If the owner of sheep, or any person having the same in charge, knowingly import or drive into this state sheep having any contagious disease; or knowingly turn out or suffer any sheep having any contagious disease to run at large upon any common, road or unenclosed lands; or sell or dispose of any sheep, knowing the same to be so diseased, he shall be fined in any sum not less than fifty, nor more than one hundred dollars.

SEC. 5013. If any person knowingly import or bring within the State any horse, mule or ass affected by the diseases known as nasal gleet, glanders or button-farcy, or suffer the same to run at large upon any common, road or unenclosed land, or use or tie the same in any public place, or off his own premises, or sell, trade or offer for sale or trade any such animal, knowing the same to be so diseased, he shall be fined not less than fifty nor more than five hundred dollars, or be imprisoned not to exceed one year in the county jail, or both.

SEC. 5014. If any horse, mule, or ass reasonably supposed to be diseased with nasal gleet, glanders or button-farcy be found running at large without any known owner, it shall be lawful for the finder thereof to take such animal, so found, before some justice of the peace, who shall forthwith cause

the same to be examined by some veterinary surgeon, or other person skilled in such diseases, and if, on examination, it is ascertained to be so diseased, it shall be lawful for such justice of the peace to order such diseased animal to be immediately destroyed and buried; and the necessary expense accruing under the provisions of this section shall be defrayed out of the county treasury.

SEC. 5015. The owner or person having charge of any swine any of which die or are killed on account of any disease, shall upon such fact coming to his knowledge, immediately burn the same.

SEC. 5016. No person shall sell or give away or offer for sale any swine that have died of any disease, or that have been killed on account of any disease.

SEC. 5017. No person shall convey upon or along any public highway or other public ground, or any private land except that owned or leased by him, any diseased swine, or swine that have died of or have been killed on account of any disease. Upon the trial for the violations of the provisions of this section, the proof that any person has hauled or is hauling dead swine from a neighborhood in which swine have been dying, or are at the time dying, from any disease, shall be presumptive evidence of his guilt.

SEC. 5018. It shall be unlawful for any person negligently or wilfully to allow his hogs or those under his control, infested with any disease, to escape his control or run at large.

SEC. 5019. Any person violating or failing to comply with any provision of the four preceding sections shall be fined not less than five nor more than one hundred dollars, or be imprisoned in the county jail not to exceed thirty days, or both.

SEC. 5020. Any person driving any cattle into the state, or any agent, servant or employe of any railroad or other corporation who shall carry transport or ship any cattle into this state, or any railroad or other corporation or person who shall carry, ship or deliver any cattle into this state or the owner, controller, lessee or agent or employe of any stock yard, receiving into such stock yard, or in any other enclosure for the detention of cattle in transit or shipment or reshipment or sale any cattle brought or shipped in any manner into this state, which at the time they were either driven, brought, shipped or transported into this state, were in such condition as to infect with or to communicate to other cattle pleuro-pneumonia, or splenic or Texas fever, shall be fined not less than three hundred and not more than one thousand dollars, or be imprisoned in the county jail not exceeding six months, or both.

SEC. 5021. Any person who shall be injured or damaged by any acts prohibited in the preceding section, in addition to the remedy therein provided, may recover the actual damages sustained by him from the person, agent, employe or corporation therein mentioned, and neither said criminal proceeding nor said civil action shall be a bar to a conviction or to a recovery in the other.

SEC. 2343. The board of supervisors of any county, when notified in writing by five or more sheep owners of such county that sheep diseased with scab, or any other malignant, contagious disease, exist in such county, shall, at any regular or special meeting, appoint a suitable person as county sheep inspector, who shall take the oath of office, whose duties shall be as

hereinafter prescribed, and whose term of office shall be for two years and until his successor is appointed and qualified.

SEC. 2344. It shall be the duty of the sheep inspector, upon the complaint of three or more sheep owners that any sheep within his jurisdiction have the scab or any other malignant, contagious disease, to immediately inspect and report in writing the result of his inspection to the county auditor, to be filed by him for reference by the board of supervisors or any party concerned. And if he deem it necessary, in order to prevent the spread of the disease to the sheep of the other owners, he shall command the owner or agent to dip or otherwise treat such diseased sheep, and shall inspect such diseased sheep every month thereafter until such disease shall be eradicated.

SEC. 2345. It shall be the duty of the sheep inspector to dip or otherwise treat such diseased sheep, should the owner or agent refuse to do so, and all costs, expenses and charges, together with a per diem of three dollars per day, shall be charged against the owner of such sheep, and shall be a lien thereon, and may be recovered in an action.

SEC. 2346. Such compensation for the inspector shall be three dollars per day, and shall be paid by the owner of the sheep, or his agent, if the disease is found to exist. In case no disease is found to exist, the complainants shall pay such fee.

SEC. 2347. Upon the arrival of any flock of sheep within the state from a distance of more than twenty miles outside the boundaries of the state, the owner or agent shall notify the inspector of the county in which such sheep are being held, and he shall inspect the flock at the expense of the owner or agent; and if the sheep are found sound shall furnish the owner or agent a certificate, which shall be a passport to any part of the state; but sheep in transport on board of railroad cars, or passing through the state on such cars, shall not come within the provisions of this section. Any violation of, or failure to comply with, the provisions of this and the four preceding sections by the owner of any sheep shall subject him to a forfeiture of not to exceed one hundred dollars, which shall be a lien on such sheep, and shall be recovered in an action by the county attorney in the name and for the use of the county.

SEC. 4979. If any person throw, or cause to be thrown, any dead animal into any river, well, spring, cistern, reservoir, stream or pond, he shall be imprisoned in the county jail not less than ten nor more than thirty days, or be fined not less than five nor more than one hundred dollars.

SEC. 4981. If any person knowingly sell any kind of diseased, corrupted or unwholesome provisions, whether for meat or drink, without making the nature and condition of same fully known to the buyer, he shall be imprisoned in the county jail not more than thirty days, or be fined not exceeding one hundred dollars.

The flesh of pregnant animals must not be sold nor used for human food after the seventh month of pregnancy for cows, and the tenth week for sows.
—*Regulations of the State Board of Health.*

OF PRACTICE OF PHARMACY

CHAPTER 18, TITLE XII

SECTION 2584. *Commissioners—powers.* The Commission of Pharmacy shall consist of three competent pharmacists who have been for the preceding five years residents of the state and engaged in practicing pharmacy, one of whom shall be annually appointed by the governor and hold office for three years and until his successor is appointed and qualified. The commission shall have power to make all needed regulations for its government and for the proper discharge of its duties under this chapter, the same to be done without expense to the state, save the necessary blanks and stationery which shall, upon requisition, be furnished by the secretary of State, and make such other regulations not inconsistent with law and as authorized in this Code, respecting the purchase, keeping and use of intoxicating liquors by registered pharmacists, not permit holders, as may be required for the prevention or abuse of the trust reposed in them, and such other matters as may be hereinafter specifically enumerated.

SEC. 2585. *Secretary and treasurer.* The commissioners of pharmacy shall annually, on the first Monday in May, elect a suitable person, who shall not be a member of said board, and who shall be known as secretary and treasurer; said secretary and treasurer shall enter upon the discharge of his duties as soon as he shall have filed with the secretary of state a good and sufficient bond in the penal sum of three thousand dollars, signed by at least two sureties, who shall justify in the aggregate to double the amount of said bond, and which shall bear upon its face the approval of the governor. The salary of said secretary and treasurer shall not exceed one thousand five hundred dollars per annum.

SEC. 2586. *License fees.* The secretary and treasurer shall keep in his office a book known as the "Commissioners of Pharmacy License Fee Book," which shall be made with ruled columns and printed headings, showing the date, the name of the person paying, and the amount of each license and fee paid, in which he shall enter all fees for licenses received by him, and on the first Monday of each month he shall file with the auditor of state a true statement thereof for the previous month, properly sworn to by him, and shall quarterly pay into the state treasury, on the first day of January, April, July and October of each year, the amount of license fees payable by law into such treasury.

SEC. 2587. *Records—compensation.* The books, accounts, vouchers and funds belonging to or kept by said board of pharmacy shall at all times be open or subject to the inspection of the governor, or any committee appointed by him. Each commissioner of pharmacy shall receive as full compensation for his services the sum of five dollars for each day actually employed in the discharge of his official duties, together with his actual traveling expenses in performing said duties, all of which shall be paid from the fees of the office, and each commissioner shall file with the auditor of state, at the end of each quarter of his official year, an itemized statement under oath of his actual time in days employed in the discharge of his duty, and traveling expenses incurred in the performance of his duty, for such quarter.

SEC. 2588. *Registered pharmacists.* No person not a registered pharma-

cist shall conduct the business of selling at retail, compounding or dispensing drugs, medicines or poisons, or chemicals for medicinal use, or compounding or dispensing physicians' prescriptions as a pharmacist, nor allow anyone who is not a registered pharmacist to so sell, compound or dispense such drugs, medicines, poisons or chemicals, or physicians' prescriptions, except such as are assistants to and under the supervision of one who is a registered pharmacist, and physicians who dispense their own prescriptions only; but no one shall be prohibited by anything contained in this chapter from keeping and selling proprietary medicines and such other domestic remedies as do not contain intoxicating liquors or poisons, nor from selling concentrated lye or potash having written or printed on the package or parcel its true name and the word "poison," sales of which need not be registered. Whoever violates either provision of this section, for the former shall pay five dollars for each day of its violation, to be recovered in an action in the name of the state, brought by the county attorney under the direction of the commission, and for the latter shall be guilty of a misdemeanor, and punished accordingly. In actions or prosecutions under this chapter it need not be proven that the defendant has not a pharmacist's certificate, but such fact shall be a matter of defense.

SEC. 2589. *Examinations—registration.* The commission, at such times and places as it may select, and in such manner as it may determine upon, shall examine all persons desiring to engage in and conduct business as registered pharmacists as contemplated in the preceding section, and, if found competent, the applicant's name shall be entered in the registry book of certificate holders. Graduates of pharmacy holding a diploma from the university, or an incorporated school or college which requires a practical experience in pharmacy of not less than four years before granting such diploma, may be registered without examination. Pharmacists thus registered have the sole right to keep and sell all medicines and poisons; except intoxicating liquors.

SEC. 2590. *Registration and examination fees.* Each person furnished a certificate and registered without examination shall pay to the commission two dollars, and each and every person whom they examine orally, or whose answers to a schedule of questions are returned subscribed to under oath, the sum of five dollars, which shall be in full for all services. And in case the examination of said person shall prove defective and unsatisfactory, and his name not be registered, he shall be permitted to present himself for re-examination within any period not exceeding twelve months next thereafter, and no charge shall be made for re-examination. The said commissioners are authorized to administer oaths pertaining to their said office, and take and certify the acknowledgments of instruments in writing. After registration, an annual fee of one dollar for a renewal certificate shall be paid on or before the twenty-second day of March by all pharmacists who continue in business, and the conduct of such business without such renewal shall be a misdemeanor.

SEC. 2591. *Registry book—certificate displayed.* The commission shall keep a registry book in which shall be recorded the names and places of residence of all certificate holders, with the date of such certificate, which shall hold good for one year, and no longer without renewal. Renewals shall be granted upon the payment of the annual fee fixed in the preceding

section. Should a certificate holder change his residence, upon notice thereof such change shall be noted in the registry book. Each certificate holder shall keep displayed in his place of business his registration certificate. A failure to comply with this requirement shall be a misdemeanor.

SEC. 2592. *Sale of adulterated drugs.* Registered pharmacists shall be responsible for the quality of all drugs, chemicals and medicines which they may sell or dispense, except those sold in the original packages of the manufacturer, and those known as patent medicines. If any such pharmacist shall knowingly adulterate or cause to be adulterated any drugs, chemicals or medical preparations by him kept for sale or sold, he shall be guilty of a misdemeanor.

SEC. 2593. *Sale of poisons.* No person shall sell at retail any poisons enumerated in schedules A. and B., except in dispensing poisons in usual quantities or doses upon the prescription of a physician as follows: Schedule A. Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia and other poisonous vegetable alkaloids and their salts, essential oil of bitter almonds, opium and its preparations except paregoric and other preparations of opium containing less than two grains to the ounce; Schedule B. Aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, creosote, digitalis, and the pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid and oxalic acid; unless the package containing such poisons has placed thereon, and also on the outside wrapper or cover, the name of the article, the word "poison," and the name and place of business of the seller; nor sell or deliver such poison unless, upon due inquiry, it be found that the party receiving it is aware of its character and represents it is to be used for proper purposes; nor sell or deliver any of the poisons included in schedule A. without also, before delivering the same, causing an entry to be made in a book kept for that purpose of the date of sale, the name and address of the purchaser, the name of the poison, the purpose for which it was represented to be required, and the name of the dispenser, which book shall be open to inspection by the proper authorities and preserved for at least five years, the entry of each such sale to be signed by the dispenser. Any person violating any of the provisions of this section, except as otherwise provided by law, shall be adjudged guilty of a misdemeanor and be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars, or by imprisonment in the county jail for not less than thirty days nor more than ninety days, or by both fine and imprisonment, in the discretion of the court.

SEC. 2594. *Itinerant vendors of drugs.* Any itinerant vendor of any drug, nostrum, ointment, or appliance of any kind for the treatment of any disease or injury, and all those who by any method publicly profess to treat or cure diseases, injury or deformity, shall pay to the treasurer of the commission of Pharmacy an annual fee of one hundred dollars, upon the receipt of which the secretary of the commission shall issue a license for one year from its date. Two thousand dollars annually of the money arising from the license fund, or so much as may be needed, shall be devoted to defraying expenses of the commission, and any balance remaining shall be paid into the state treasury. Said commission shall, on the first day of

January of each year, make a verified and itemized statement in writing to the auditor of state of all receipts and expenditures of moneys coming into their hands by virtue of their office. Any violation of this section shall be a misdemeanor, and any person shall, upon conviction thereof, pay a fine of not less than one hundred dollars, nor more than two hundred dollars. In actions or prosecutions under this chapter it need not be proven that the defendant has not a license, but such fact shall be a matter of defense.

SEC. 2595. *Penalty for false representations.* If any person shall procure or attempt to procure a certificate of registry for himself or another by means of false representations or device, or without being a registered pharmacist shall conduct a place for retailing, compounding or dispensing drugs, medicines or chemicals, or for compounding or dispensing physicians' prescriptions, or shall use or exhibit the title of registered pharmacist, he shall be guilty of a misdemeanor, and each several day a place shall be so used shall be held to be a separate and several offense.

SEC. 2596. *Revocation of certificate.* When a registered pharmacist has been convicted of a violation of the provisions of this chapter, in addition to the other penalties provided by law, the commission, in its discretion, may revoke his certificate of registry.

INSPECTION OF PETROLEUM PRODUCTS

CHAPTER 11, TITLE XII, AS AMENDED BY TWENTY-SEVENTH GENERAL ASSEMBLY

SECTION 2503. The governor shall appoint such number of inspectors of the products of petroleum as may be determined by the state board of health, not to exceed fourteen in number. Each inspector shall be a resident of the state, and not interested directly or indirectly in the manufacture or sale of products of petroleum. His term of office shall begin on the first day of July in each even numbered year. He shall give bond to the state in the penal sum of five thousand dollars, conditioned for the faithful performance of his duties, with sureties who shall, in addition to the usual justification, make oath, entered on the bond, that they are not directly or indirectly interested in the manufacture or sale of products of petroleum for illuminating purposes, which bond shall be for the benefit of all persons injured through the failure of the inspector to perform his duties, and shall be filed with, and the sureties thereon approved by, the secretary of state. (Where there are two or more inspection stations, under the jurisdiction of the same inspector, he may with the approval of the governor appoint a deputy or deputies, each of whom shall be a resident of the state and not interested directly or indirectly in the manufacture or sale of petroleum products, for all of whose official acts the principal shall be responsible, and who shall serve without additional compensation or expense to the state.)*

SEC. 2504. The state board of health shall make rules and regulations^s for the inspection of petroleum products, for the government of inspectors, and prescribe the instruments and apparatus to be used. Such rules and

* Amendment Chapter 61. Twenty-seventh General Assembly.

regulations shall be approved by the governor, and, when so approved, shall be binding upon all inspectors.

SEC. 2505. Each inspector shall be furnished, at reasonable expense to the state, with the necessary instruments and apparatus for testing, and shall promptly make inspection, and test and brand all illuminating oils kept for sale, and for such purpose may enter upon the premises of any person. He shall reject all oils for illuminating purposes which will emit a combustible vapor at a temperature of one hundred and five degrees, standard Fahrenheit thermometer, closed test, not less than one-half pint of oil to be used in the flash test. If upon test and examination the oil shall meet the requirements, he shall brand over his official signature and date the barrel or package holding the same, "Approved, flash test..... degrees," inserting in the blank the number. Should it fail to meet the requirements, it shall be branded under his official signature and date, "Rejected for illuminating purposes." All inspection shall be made within the state, and paid for by the person for whom the inspection is made, at the rate of ten cents per barrel, fifty-five gallons for this purpose constituting a barrel, which charge shall be a lien upon the oil inspected, and be collected by the inspector, reported and paid into the state treasury, except as otherwise provided in this chapter. For the purposes of this act, gasoline, benzine and naphtha shall be deemed illuminating oil. No gasoline shall be sold, given away or delivered to any person in this state until the package, cask, barrel or vessel containing the same has been plainly marked "gasoline."

SEC. 2506. Each inspector shall keep an accurate record of all oils inspected and branded, the number of gallons, the number and kind of barrels or packages, the date and number of gallons approved, the number rejected, the name of the person for whom inspection was made, and the amount of money received therefor, the necessary traveling expenses incurred, the amount expended for instruments and apparatus, and the expenses incurred in prosecutions, which record at all reasonable times shall be open to public inspection. A copy of this record for the preceding month shall be filed with the secretary of state on or before the fifteenth day of each month, and no item of expenses shall be allowed and paid not shown in such reports.

SEC. 2507. Each inspector shall be allowed as full compensation for his services all fees and commissions earned and collected by him up to fifty dollars per month, and twenty-five per cent of any sum collected in any one month in excess of fifty dollars, but in no case shall his compensation exceed one hundred dollars per month. He shall be allowed such other sum as he necessarily expends for prosecutions incurred in the discharge of his duties and for necessary help in branding barrels. All money collected by the inspector in excess of the allowance herein provided shall, on or before the fifteenth day of each month, be paid to the state treasurer. Should any inspector pay out more money in any one month for necessary expenses incurred, for prosecutions for the violation of the provisions of this chapter, or for necessary help in branding barrels, than fees collected, such excess shall be refunded to him on his filing a sworn itemized statement with the governor, showing fees collected and expenses paid or incurred, which statement must be approved by the governor.

SEC. 2508. If any person, company or corporation, or agent thereof, shall sell, or attempt to sell, any product of petroleum for illuminating purposes which has not been inspected and branded as in this chapter provided, or shall falsely brand any barrel or package containing such petroleum products, or shall refill with products of petroleum barrels or packages having the inspector's brand thereon, without erasing such brand and having the contents thereof inspected, and the barrel or package rebranded, or shall purchase, sell or dispose of any empty barrel or package without thoroughly removing the inspection brand, or shall knowingly or negligently sell, or cause to be sold, or shall use or cause to be used, any product of petroleum mentioned in this chapter not inspected and tested, except as otherwise authorized herein; or if any person shall adulterate with any substance for the purpose of sale or use any product of petroleum to be used for illuminating purposes in such a manner as to render it dangerous, or shall sell or offer for sale, or use any product of petroleum for illuminating purposes which will emit a combustible vapor at a temperature of less than one hundred and five degrees, standard Fahrenheit thermometer, closed test, except as otherwise provided in this section for illuminating railway cars, boats and public conveyances, and except that the gas or vapor thereof shall be generated in closed reservoirs outside the building to be lighted thereby, and except the lighter products of petroleum when used in and for street light by street lamps, shall be fined not less than ten dollars nor more than fifty dollars; or if any common carrier shall receive for transportation or transport in the state as freight any oil or fluid, whether composed wholly or in part of petroleum or its products, or of any substance which will ignite at a temperature of three hundred degrees Fahrenheit thermometer, open test; or if any such carrier of passengers shall burn any oil or fluid which will ignite at a temperature of three hundred degrees, for lighting any lamp, vessel or fixture of any kind in any railway passenger, baggage, mail or express car, or boat or street railway car, stage-coach, or other means of public conveyance; or if any inspector shall falsely brand any barrel or package, or shall practice any fraud or deceit in office, or be guilty of any official misconduct or culpable negligence to the injury of another, or shall deal or have any pecuniary interest, directly or indirectly, in any oils or fluids sold for illuminating purposes while holding such office, he or such person, company, corporation or agent shall be fined not less than fifty dollars, and be liable in a civil action for all damages which may be sustained on account thereof, and each such inspector shall be fined in a sum not less than ten dollars nor more than one thousand dollars, or imprisonment in the county jail not exceeding six months, or be punished by both fine and imprisonment.

SEC. 2509. It shall be the duty of the governor to remove from office an inspector who is incompetent or unfaithful in the discharge of his official duty or, having knowledge of the violation of any of the provisions of this chapter, shall neglect or refuse to prosecute the offender.

SEC. 2510. The secretary of state shall make and deliver to the governor a report, for the fiscal year ending on the thirtieth day of June in each odd-numbered year, of all inspections made, the receipts and expenditures therefor, and such other items as are by this chapter required to be made of record.

INSPECTION AND USE OF PRODUCTS OF PETROLEUM

CHAPTER EIGHTY-THREE, LAWS TWENTY-EIGHTH GENERAL ASSEMBLY

SEC. 1. *Use of gasoline lamps.* That section two thousand five hundred and eight (2508) of the Code, as amended by chapter sixty-two of the acts Twenty-seventh General Assembly, be, and the same is hereby, amended by striking out the words, "the Wellsbach hydro-carbon incandescent lamp," in the twenty-third line thereof, and inserting in lieu thereof, the following: "Such lamps which, having been submitted to the state board of health and having been examined and tested by said board shall be found to be safe for the use of the public."

SEC. 2. *Duties of state board of health* The state board of health shall examine the particular design, mechanism, and workmanship of such lamps as shall be presented to such board, and test said lamps, and, if it shall find any lamp to be safe, said board shall enter the findings of the board upon the records of the proceedings of said board. The board shall have power, in case it comes to the notice of the board that any lamp which it has heretofore approved as safe, because either of change of design, the use of unsuitable material, or poor workmanship in the construction of such lamps, or for any other cause, is unsafe as then manufactured, and dangerous to public safety, to cancel its approval of such lamp, and after such cancellation of the approval of said lamp it shall be unlawful to use the same, and no lamps manufactured or sold after such disapproval shall be used in burning the lighter products of petroleum for illuminating purposes.

USE OF GASOLENE, BENZINE, NAPHTHA AND OTHER
EXPLOSIVES IN TENEMENTS

CHAPTER 130, LAWS TWENTY-EIGHTH GENERAL ASSEMBLY

SEC. 1. *Use of dangerous fluids forbidden.* That it shall be unlawful for any person to establish or operate any dye works, pantorium, or cleaning works, in which gasoline, benzine, naphtha, or other explosive or dangerous fluids are used for the purpose of cleaning or renovating wearing apparel or other fabrics, in any building any part of which is used as a residence or lodging house.

SEC. 2. *Penalty.* Any person convicted of violating the provisions of the foregoing section shall be fined in a sum not exceeding fifty (50) nor less than ten (10) dollars.

TO PROHIBIT THE USE OF IMPURE OIL IN COAL MINES

CHAPTER 9, TITLE XII CODE, AS AMENDED BY TWENTY-SEVENTH GENERAL
ASSEMBLY

SECTION 2493. Only pure animal or vegetable oil, paraffine or electric lights shall be used for illuminating purposes in any mine in this State, and

for the purpose of determining the purity of oils the State Board of Health shall fix a standard of purity and establish regulations for testing said oil, and said standard and regulations, when so determined, shall be recognized by all the courts of the State.

SEC. 2494. Any person, firm or corporation, either by themselves, agents or employees, selling or offering to sell for illuminating purposes in any mine in this State any adulterated or impure oil, or oil not recognized by the State Board of Health as suitable for illuminating purposes as contemplated in this chapter, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense; and any mine owner or operator or employe of such owner or operator who shall knowingly use, or any mine operator who shall knowingly permit to be used, for illuminating purposes in any mine in this state any impure* or adulterated oil, or oil that has not been inspected and approved by an inspector, or any oil the use of which is forbidden by this chapter, shall, upon conviction thereof, be fined not less than five dollars nor more than twenty-five dollars.

†SEC. 2495. It shall be the duty of an inspector of petroleum products to inspect and test all oil offered for sale, sold, or used for illuminating purposes in coal mines in this state, and for such purpose he may enter upon the premises of any person. If upon tests and examination the oil shall meet the requirements made and provided by the state board of health, he shall brand, over his own official signature and date, the barrel or vessel holding the same with the words "Approved for illuminating coal mines." Should it fail to meet such requirements, he shall brand it over his official signature and date, "Rejected for illuminating coal mines." All inspection shall be made within this State, and paid for by the person for whom the inspection is made at the rate of ten cents per barrel or vessel, which charge shall be a lien on the oil inspected, and be collected by the inspector. Each inspector shall be governed in all things respecting his record, compensation, expenses, and returns to the treasurer of state and secretary of state as provided in sections two thousand five hundred and six and two thousand five hundred and seven of the Code. It shall be the duty of the inspector whenever he has good reason to believe that oil is being sold or used in violation of the provisions of this chapter to make complaint to the county attorney of the county in which the offense was committed, who shall forthwith commence proceedings against the offender, in any court of competent jurisdiction. All reasonable expenses for analyzing suspected oil shall be paid by the owner of the oil whenever it is found that he is selling or offering to sell impure oil in violation of the provisions of this chapter. Such expenses may be recovered in a civil action, and in criminal proceedings such expenses shall be taxed as part of the costs.

SEC. 2596. The provisions of this chapter shall apply only to coal mines.

* As amended.

† Substituted for Section 2495, Code.

TO PREVENT THE ADULTERATION OF, AND DECEPTION IN
THE SALE OF LINSEED OR FLAXSEED OIL, TND TO
REGULATE THE SALE THEREOF

CHAPTER 52, ACTS OF THE TWENTY-SEVENTH GENERAL ASSEMBLY

SECTION 1. *Manufacture—sale.* No person, firm, or corporations shall manufacture or mix for sale, sell, or offer for sale, as raw linseed oil, any article which is not wholly the product of commercially pure linseed or flaxseed. Nor shall any person, firm, or corporation manufacture or mix for sale, sell, or offer for sale, as boiled linseed oil, any article, unless the oil from which said article is made be wholly the product of commercially pure linseed or flaxseed, and unless the same has been heated to at least two hundred and twenty-five (225) degrees Fahrenheit.

SEC. 2. *Compounds excepted.* Nothing in this act shall be construed as prohibiting the sale or manufacture of any compound of linseed or flaxseed oil; provided, that such compound, if it imitates in appearance and is designed to take the place of linseed or flaxseed oil, shall not be manufactured or mixed for sale, sold, or offered for sale under a name or description containing the words "linseed oil" or "flaxseed oil."

SEC. 3. *Penalty.* Any person, firm, or corporation who shall violate any of the provisions of this act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished for each and every such violation, by a fine of not less than fifty (50) dollars, nor more than five hundred (500) dollars; and in default of the payment of such fine shall be committed to the county jail for a period of not less than thirty (30) days.

SEC. 4. *Duties and powers of inspectors and board of health.* It shall be the duty of the inspectors of petroleum products, under such rules and regulations as the state board of health may prescribe, to enforce the provisions of this act. The violation of any of the provisions of this act relating to the manufacture and adulteration of linseed or flaxseed oil is hereby declared to be a public nuisance, and any court of competent jurisdiction is authorized, upon application of the board of health or its agents, to enjoin such violation, in the same manner as injunctions are usually granted under the rules and practice of such court. The board, its inspectors, assistants, experts, and chemists, and others appointed by it, shall have access, ingress, and egress to and from all places of business and buildings where linseed or flaxseed oil is kept for sale, stored or manufactured. They shall also have the power and authority to open any tank, barrel, can, or other vessel containing such oil, and may inspect the contents thereof, and take samples therefrom for analysis. All clerks, bookkeepers, express agents, railroad agents, or officials, employes of common carriers, or other persons, shall render them all the assistance in their power, when so requested, in tracing, finding, or inspecting such oil.

SEC. 5. *Cost of analysis—county attorney.* It shall be the duty of the court in every action brought under this act to tax as costs in the cause, the actual and necessary expense of analyzing the linseed or flaxseed oil which shall be in controversy in such proceeding; provided, that the amount so taxed shall not exceed the sum of twenty-five (25) dollars. It shall be the duty of the county attorney, upon the application of the state board of

health, to attend to the prosecution in the name of the state, of any suit brought for violation of any of the provisions of this act within his county.

BOXING CONTESTS OR SPARRING EXHIBITIONS

CHAPTER 133, LAWS TWENTY-EIGHTH GENERAL ASSEMBLY

SECTION 1. *Penalty.* Whoever engages in any boxing contest or sparring exhibition with or without gloves for a prize, reward, or anything of value, at which an admission fee is charged or received, either directly or indirectly, and whoever knowingly aids, abets, or assists in any such boxing contest or sparring exhibition, and any owner or lessee of any ground, lot, building, hall, or structure of any kind knowingly permitting the same to be used for such boxing contest or sparring exhibition, shall be fined not exceeding three hundred dollars, or imprisonment in the county jail not exceeding ninety days.

MISCELLANEOUS—FROM THE CODE

OPIUM SMOKING

SEC. 5003 Any person who shall keep and maintain any shop, house, room or other place to be resorted to by other persons, in which opium or any of its preparations or compounds is sold or given away to be smoked or used in such place, or who allows opium or any of its preparations to be smoked in such shop, house, room or other place, and every person who resorts to such shop, house, room or other place for the purpose of smoking opium or its preparations and compounds, shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not exceeding five hundred dollars, or imprisoned in the county jail not exceeding six months, or both. The state, upon the trial of any person indicted for keeping a place described in this section, may, for the purpose of establishing the character of the place so kept by the defendant, introduce evidence of the general reputation of such place so kept, and such evidence shall be competent for such purpose.

SELLING FIREARMS TO MINORS

SEC. 5004 No person shall knowingly sell, present or give any pistol, revolver or toy pistol to any minor. Any violation of this section shall be punished by a fine of not less than twenty-five nor more than one hundred dollars, or by imprisonment in the county jail not less than ten nor more than thirty days.

SALE OF TOBACCO TO MINORS

SEC. 5005 No person shall directly or indirectly, by himself or agent, sell, barter or give to any minor under sixteen years of age any cigar or tobacco in any form whatever, except upon the written order of his parent or guardian. Any violation of this section shall be punished by a fine of not less than five nor more than one hundred dollars, and the offender shall stand committed until fine and costs of prosecution are paid.

SALE OF CIGARETTES

SEC. 5006 No one, by himself, clerk, servant, employe or agent, shall, for himself or any person else, directly or indirectly, or upon any pretense, or by any device, manufacture, sell, exchange, barter, dispense, give in consideration of the purchase of any property, of any services, or in evasion hereof, or keep for sale, any cigarettes or cigarette paper or cigarette wrappers, or any paper made or prepared for the purpose of making cigarettes, or for the purpose of being filled with tobacco for smoking; or own or keep, or be in any way concerned, engaged or employed in owning or keeping, any such cigarettes or cigarette paper or wrappers, with intent to violate any provision of this section; or authorize or permit the same to be done. Whoever is found guilty of violating any of the provisions of this section, for the first offense shall pay a fine of not less than twenty-five dollars nor more than fifty dollars and costs of prosecution, and stand committed to the county jail until such fine and costs are paid; for the second and each subsequent offense, he shall pay, upon conviction thereof, a fine of not less than one hundred dollars nor more than five hundred dollars and the costs of prosecution, or be imprisoned in county jail not to exceed six months: *provided* that the provisions hereof shall not apply to the sales of jobbers doing an interstate business with customers outside the state.

USE OF BARBED WIRE

SEC. 2817 Barbed wire shall not be used to inclose any school buildings or grounds, nor for any fence or other purpose within ten feet of any such grounds. Any person violating the provisions of this section shall be punished by fine not exceeding twenty-five dollars.

MINERS—PROVISIONS FOR THEIR SAFETY

SEC. 2486. *Escape and air shafts.* The owner or person in charge of any mine operated by shaft, or one having a slope or drift opening in which five or more men are employed, shall construct and maintain at least two distinct openings for each seam of coal worked, which in shaft mines shall be separated by natural strata of not less than one hundred feet in breadth, and in slope or drift mines not less than fifty feet in breadth, through which ingress and egress at all times shall be unobstructed to the employes, and in slope or drift mines shall be provided with safe and available traveling-ways; all traveling-ways and escapes to be kept free from water and falls of roof. All escape-shafts not provided with hoisting appliances as hereinafter provided shall have stairs at an angle of not more than sixty degrees in descent, kept in safe condition, with proper landings at easy and convenient distances apart. He shall provide all air-shafts where fans are used with working fans for ventilation, and those used for escapes with suitable appliances for hoisting underground workmen, at all times ready for use while the men are at labor, and no combustible material shall be allowed to be or remain between any escape-shaft and hoisting-shaft, save as it may be absolutely necessary in the operation of the mine. A furnace-shaft, if large enough, may be divided into an escape and a furnace-shaft, the partition to be of incombustible material for a distance of not less than fifteen feet from the bottom thereof, and so constructed throughout as to exclude the heated air and smoke from the side used as an escape-shaft. Where two or more mines are connected underground, the several owners, by joint agreement,

may use the hoisting-shaft or slope of the one as an escape for the other. In all cases where escape-shafts are constructed less than one hundred feet from the hoisting-shaft, there shall be built and maintained an under-ground traveling-way from the top of the escape-shaft, so as to furnish the proper protection from fire for a distance of one hundred feet from such hoisting-shaft. No escape-shaft shall be located or constructed without first giving notice to the district inspector, who shall determine the distance it shall be from the main shaft, and without his consent it shall not be less than 300 feet, nor shall any building except the fan-house be placed nearer than 100 feet of the escape; but the provisions of this chapter relating to escape-ways shall not apply to mines where the same are lost or destroyed by reason of the drawing of pillars preparatory to the abandonment of the mine, and in such mine not more than twenty persons shall be employed at one time.

SEC. 2488. *Ventilation.* The owner or person in charge of any mine shall provide and maintain, whether the mine be operated by shaft, slope or drift, an amount of ventilation of not less than 100 cubic feet of air per minute for each person, nor less than 500 cubic feet of air per minute for each mule or horse employed therein, which shall be so circulated throughout the mines as to dilute, render harmless and expel all noxious and poisonous gases in all working parts of the same; to do this, artificial means by exhaust-steam, forcing-fans, furnaces, or other contrivances of sufficient capacity and power, shall be kept in operation. If a furnace is used, it shall be so constructed, by lining the up-cast for a sufficient distance with incombustible material, that fire cannot be communicated to any part of the works. When the mine inspector shall find the air insufficient, or the men working under unsafe conditions, he shall at once give notice to the mine owner or his agent or person in charge, and, upon a failure to make the necessary changes within a reasonable time, to be fixed by him, he may order the men out, to remain out until the mine is put in proper condition.

SEC. 2489. *Safety appliances—competent engineers—boys not employed.* The owner or person in charge of any mine shall in all mines operated by shaft or slope, where the voice cannot be distinctly heard, provide and maintain a metal speaking-tube or other means of communication, kept in complete order from the bottom or interior to the top or exterior, also a sufficient safety catch and proper cover overhead on all cages, and an adequate brake to all drums or other devices used for lowering or hoisting persons, an approved safety gate at the top of each shaft, springs at the top of each slope, and a trail attached to each train used therein. He shall not knowingly place in charge of any engine used in or about the operation of the mines any but experienced, competent and sober engineers, who shall not allow anyone but those designated for that purpose to handle or in any way interfere with it or any part of the machinery, nor shall more than ten persons be allowed to descend or ascend in any cage at one time, or such less number as may be fixed by the district mine inspector, nor anyone but the conductor on a loaded cage or car. He shall not allow a boy under twelve years of age to work in the mines, and, when in doubt regarding the age of one seeking employment, shall, before engaging him, obtain the affidavit of the applicant's parent or guardian in regard thereto. He shall at all times keep a sufficient supply of timber to be used as props, convenient and ready

for use, and shall send such props down when required and deliver them to the places where needed.

TO PREVENT ACCIDENTS BY RAILWAYS

SEC. 2054. *Cattle-guards—crossings—signs.* Every corporation constructing or operating a railway shall make proper cattle-guards where the same enters or leaves any improved or fenced land, and construct at all points where such railway crosses any public road good, sufficient and safe crossings and cattle-guards, and shall erect at such points, at a sufficient elevation from such road as to admit of free passage of vehicles of every kind, a sign with large and distinct letters placed thereon, to give notice of the proximity of the railway, and warn persons of the necessity of looking out for trains. Any railway company neglecting or refusing to comply with the provisions of this section shall be liable for all damages sustained by reason of such refusal or neglect, and it shall only be necessary, in order to recover, for the injured party to prove such neglect or refusal.

SEC. 2060. *Interlocking switches.* When in any case two or more rail roads cross each other at a common grade, or a railroad crosses a stream by swing or drawbridge, they may be equipped thereat with an interlocking switch system, or other suitable safety device rendering it safe for engines or trains to pass thereover without stopping, and if such interlocking switch system or other safety device shall have been approved by the railroad commissioners, then the engines and trains of such railroad or railroads may pass over such crossings or bridge without stopping, the provisions of any other law to the contrary notwithstanding.

SEC. 2071. *Liability for negligence or wrongs of employes.* Every corporation operating a railway shall be liable for all damages sustained by any person, including employes of such corporation, in consequence of the neglect of the agents, or by any mismanagement of the engineers or other employes thereof, and in consequence of the wilful wrongs, whether of commission or omission, of such agents, engineers or other employes, when such wrongs are in any manner connected with the use and operation of any railway on or about which they shall be employed, and no contract which restricts such liability shall be legal or binding.

SEC. 2072. *Signals at road crossings.* A bell and a steam whistle shall be placed on each locomotive engine operated on any railway, which whistle shall be twice sharply sounded at least sixty rods before a road crossing is reached, and after the sounding of the whistle the bell shall be rung continuously until the crossing is passed; but at street crossings within the limits of cities or towns the sounding of the whistle may be omitted, unless required by ordinance or resolution of the council thereof; and the company shall be liable for all damages which shall be sustained by any person by reason of such neglect. Any officer or employe of any railway company violating any of the provisions of this section shall be punished by a fine not exceeding one hundred dollars for each offense.

SEC. 2073. *Stopping at railway crossings.* All trains run upon any railroad in this state which intersects or crosses any other railroad upon the same level shall be brought to a full stop at a distance of not less than two hundred nor more than eight hundred feet from the point of intersection or crossing, before such intersection or crossing is passed, except as otherwise

provided in this chapter. Any engineer violating the provisions of this section shall forfeit one hundred dollars for each offense, to be recovered in an action in the name of the state for the benefit of the school fund, and the corporation on whose road such offense is committed shall forfeit the sum of two hundred dollars for each offense, to be recovered in like manner.

SEC. 710. *Dangerous buildings.* They (cities and towns) shall have power to provide by ordinance for the repair, removal or destruction of any building which is dangerous, or which may be liable to fall, and to levy and collect a special tax against the property and owner thereof for the expense thereof, as other special taxes are levied and collected.

SEC. 711. *Fires—electric apparatus—fire limits.* They shall have power to make regulations against danger from accidents by fire or electrical apparatus, to establish fire limits, and to prohibit within such limits the erection of any building or addition thereto, unless the outer walls be made of brick, iron, stone, mortar, or other non-combustible material, with fireproof roofs, and to provide for the removal of any structure erected contrary to such prohibition.

SEC. 712. *Fire escapes.* They shall have power * * * to require the construction of fire escapes to buildings, and regulate and control the same; to cause all buildings, structures and enclosures that may be in such condition as to cause danger from falling to be fixed, or from fire to be immediately made safe or removed.

SEC. 713. *Inspection of steam boilers and magazines.* They shall have power to provide for the inspection of steam boilers, and all places used for the storage of explosive or inflammable substances or materials, and to prescribe the necessary means and regulations to secure the public against accidents and injuries therefrom, and to assess the costs and expenses of such proceedings against the property and owners thereof in the manner provided for special assessments.

SEC. 2074. *Contract or rule limiting liability.* No contract, receipt, rule or regulation shall exempt any railway corporation engaged in transporting persons or property from the liability of a common carrier, or carrier of passengers, which would exist had no contract, receipt, rule or regulation been made or entered into.

SEC. 2079. *Couplers on new or repaired cars.* No corporation, company or person operating any line of railroad within this state, or any car manufacturer or transportation company using or leasing cars therein, shall put in use any new car or any old one that has been to the shop for general repairs to one or both of its drawbars, that is not equipped with automatic couplers so constructed as to enable any person to couple or uncouple them without going between them.

SEC. 2080. *On all cars.* After January 1, 1896, no corporation, company or person, operating a railroad, or any transportation company using or leasing cars, shall have upon any railroad in this state any car that is not equipped with such safety automatic coupler.

SEC. 2081. *Driver brake on engines.* No corporation, company or person operating any line of railroad in the state shall use any locomotive engine upon any railroad or in any railroad yard in the state that is not equipped with a proper and efficient power brake, commonly called a "driver brake."

SEC. 2082. *Power brake on cars.* No corporation, company or person

operating a line of railroad in the state shall run any train of cars that shall not have therein a sufficient number of cars with some kind of efficient automatic or power brake to enable the engineer to control the train without requiring brakemen to go between the ends or on the top of the cars to use the hand brake.

SEC. 2083. *Penalty.* Any corporation, company or person operating a railroad in this state and using a locomotive engine, or running a train of cars, or using any freight, way or other car contrary to the provisions of the four preceding sections, shall be guilty of a misdemeanor, and shall be subject to a fine of not less than five hundred nor more than one thousand dollars for each and every offense; but such penalties shall not apply to companies hauling cars belonging to railroads other than those of this state which are engaged in interstate traffic. Any railway employe who may be injured by the running of such engine, train or car contrary to the provisions of said sections shall not be considered as waiving his right to recover damages by continuing in the employ of the corporation, company or person operating such engine, train or cars.

SEC. 2403. *Selling or giving (intoxicating liquors) to minor or intoxicated person or person in the habit of becoming intoxicated.* No person by himself, agent or otherwise, shall sell or give any intoxicating liquors to any minor for any purpose, except upon written order of his parent, guardian or family physician, or sell the same to any intoxicated person or one in the habit of becoming intoxicated. Any person violating the provisions of this section shall forfeit and pay the sum of one hundred dollars, to be collected by action against him, or, if a permit holder, against him and the sureties on his bond. Such action may be brought by any citizen of the county. One-half of the amount so collected shall go to the informer and one-half to the school fund of the county.

SEC. 2418. *Civil action for damages by wife, parent, child, etc.* Every wife, child, parent, guardian, employer or other person who shall be injured in person or property or means of support by any intoxicated person, or in consequence of the intoxication, habitual or otherwise, of any person, shall have a right of action in his or her own name against any person who shall, by selling or giving to another contrary to the provisions of this chapter any intoxicating liquors, cause the intoxication of such person, for all damages actually sustained, as well as exemplary damages; and a married woman shall have the same right to bring suits, prosecute, and control the same and the amount recovered, as if a single woman; and all damages recovered by a minor under this section shall be paid either to such minor or his parent, guardian or next friend, as the court shall direct, and all suits for damages under this section shall be by civil action in any court having jurisdiction thereof.

SEC. 4727. *Murder.* Whoever kills any human being with malice aforethought, either expressed or implied, is guilty of murder.

SEC. 4728. *First degree.* All murder which is perpetrated by means of poison, or lying in wait, or any other kind of wilful, deliberate and premeditated killing, or which is committed in the perpetration or attempt to perpetrate any arson, rape, robbery, mayhem or burglary, is murder in the first degree, and shall be punished with death, or imprisonment for life at

hard labor in the penitentiary, as determined by the jury, or by the court if the defendant pleads guilty.

SEC. 4729. *Second degree.* Whoever commits murder otherwise than as set forth in the preceding section is guilty of murder of the second degree, and shall be punished by imprisonment in the penitentiary for life, or for a term of not less than ten years.

SEC. 4747. *Killing in duel.* Whoever fights a duel with deadly weapons, and inflicts a mortal wound on his antagonist, is guilty of murder in the first degree, and shall be punished accordingly.

SEC. 4748. *Duelling—challenge.* Any person who fights a duel with deadly weapons, or is present thereat as aid, second or surgeon, or advises, encourages or promotes the same, although no homicide ensue; and any person who challenges another to fight a duel, or sends or delivers any verbal or written message purporting or intended to be such challenge, although no duel ensue, shall be fined in a sum not exceeding one thousand dollars nor less than four hundred dollars, and imprisoned in the penitentiary not more than three nor less than one year.

SEC. 4751. *Manslaughter.* Any person guilty of the crime of manslaughter shall be imprisoned in the penitentiary not exceeding eight years, and fined not exceeding one thousand dollars.

SEC. 4752. *Maiming or disfiguring.* If any person, with intent to maim or disfigure, cut or maim the tongue; cut out or destroy an eye; cut, slit or tear off an ear; cut, bite, slit or mutilate the nose or lip; cut off or disable a limb or any member of another person, he shall be imprisoned in the penitentiary not more than five years, and fined not exceeding one thousand nor less than one hundred dollars.

SEC. 5036. *Engaging in prize fight.* Whoever engages as principal in any prize fight shall be fined not less than one hundred nor more than one thousand dollars, or be imprisoned in the penitentiary for a term of not more than one year, or both.

SEC. 5037. *Aiding or abetting.* Whoever aids or assists in any prize fight shall be fined not exceeding five hundred dollars, or imprisoned in the county jail for not more than one hundred and fifty days.

SEC. 5039. *Racing or fast driving on highways.* Any person who shall be guilty of racing or driving upon the public highway, in a manner likely to endanger the persons or lives or others, shall be guilty of a misdemeanor, and shall be fined not exceeding one hundred dollars, or be imprisoned in the county jail not exceeding thirty days.

SEC. 4768. *Assault with intent to murder.* If any person assault another with intent to commit murder, he shall be imprisoned in the penitentiary not exceeding ten years.

SEC. 4771. *With intent to inflict great bodily injury.* If any person assault another with intent to inflict a great bodily injury he shall be imprisoned in the county jail not exceeding one year, or be fined not exceeding five hundred dollars.

SEC. 4773. *Mingling poison with food, etc.* If any person mingle any poison with any food, drink or medicine, with intent to kill or injure any human being, or wilfully poison any spring, well, cistern or reservoir of water, he shall be imprisoned in the penitentiary not exceeding ten years, and be fined not exceeding one thousand dollars.

SEC. 4775. *Carrying concealed weapons.* If any person carry upon his person any concealed weapon, or shall wilfully draw and point a pistol, revolver or gun at another, he shall be guilty of a misdemeanor, and be fined not more than one hundred dollars, or imprisoned in the county jail not more than thirty days; but this section shall not apply to police officers and other persons whose duty it is to execute process or warrants, or make arrests.

SEC. 4776. *Burning inhabited dwelling in nighttime.* If any person wilfully or maliciously burn in the nighttime the inhabited building, boat or vessel of another, or wilfully and maliciously set fire to any other building, boat or vessel owned by himself or another, by the burning whereof such inhabited building, boat or vessel is burnt in the nighttime, he shall be imprisoned in the penitentiary for life or any term of years.

SEC. 4759. *Attempt to produce miscarriage.* If any person, with intent to produce the miscarriage of any pregnant woman, wilfully administer to her any drug or substance whatever, or, with such intent, use any instrument or other means whatever, unless such miscarriage shall be necessary to save her life, he shall be imprisoned in the penitentiary for a term not exceeding five years, and be fined in a sum not exceeding one thousand dollars.

SEC. 4766. *Exposing child.* If the father or mother of any child under the age of six years, or any person to whom such child has been intrusted or confided, expose such child in any highway, street, field, house or outhouse, or any other place, with intent wholly to abandon it, he or she, upon conviction thereof, shall be imprisoned in the penitentiary not exceeding five years.

SEC. 4796. *Death caused by dynamiting.* If any person wilfully deposits or throws in, under or about any dwellinghouse, building, boat, vessel or raft or other inhabited place, where its explosion will or is likely to destroy or injure the same, any dynamite, nitroglycerine, giant powder or other material, and by reason of the explosion thereof any person is killed, he shall be guilty of murder.

SEC. 4797. *Or injury to person.* If any person wilfully deposits or throws any dynamite, nitroglycerine or giant powder or other explosive material as provided in the preceding section, and by means of the explosion thereof any person is injured, he shall be guilty of an assault with intent to commit murder.

SEC. 4809. *Placing obstructions on railways.* If any person shall wilfully and maliciously place any obstruction on the track of any railroad in the state, or remove any rail therefrom, or in any other way injure such railroad, or do any other thing thereto whereby the life of any person is or may be endangered, he shall be imprisoned in the penitentiary for life, or for any term not less than two years.

SEC. 4810. *Shooting or throwing at train.* If any person throw any stone or other substance whatever, or present or discharge any gun, pistol or other firearm at any railroad train, car or locomotive engine, he shall be guilty of a misdemeanor.

SEC. 4812. *Uncoupling locomotive or cars.* If any person shall wilfully and maliciously uncouple or detach the locomotive or tender or any of the cars of any railroad train, or in any manner aid, abet or procure the doing

of the same, such person shall be imprisoned in the penitentiary not exceeding five years, or fined not exceeding one thousand dollars, or both, at the discretion of the court.

SEC. 4945. *Violating sepulchre.* If any person, without lawful authority, wilfully dig up, disinter, remove or carry away any human body, or the remains thereof, from its place of interment; or aid, assist, encourage, incite or procure the same to be done or attempted; * * * he shall be imprisoned in the penitentiary not more than two years, or be fined not exceeding twenty-five hundred dollars, or both.

SEC. 5025. *Boxing tumbling rods of threshing machines.* If any person run any threshing machine in this state without having two lengths of tumbling rods next the machine together with the knuckles or joints and jacks of the tumbling rods safely boxed and secured while the machine is running, he shall be fined not less than ten nor more than fifty dollars for every day or part of day he shall violate this section.

SEC. 5026. *Steam boilers.* Any person owning or operating steam boilers in this state shall provide the same with steam gauge, safety-valve and water gauge, and keep the same in good order. Any person neglecting so to do shall be fined not less than fifty nor more than five hundred dollars,

SEC. 4989. *Sale of impure or skimmed milk—skimmed milk cheese—labeling.* If any person shall sell, exchange, or expose for sale or exchange, or deliver or bring to another, for domestic or potable use, or to be converted into any product of human food, any unclean, impure, unhealthy, adulterated, unwholesome or skimmed milk, or milk from which has been held back what is commonly known as strippings, or milk taken from an animal having disease, sickness, ulcers, abscess or running sore, or which has been taken from an animal within fifteen days before or five days after parturition; or if any person, having cows for the purpose of producing milk or cream for sale, shall stable them in an unhealthy place or crowded manner, or shall knowingly feed them food which produces impure, unwholesome milk, or shall feed them distilled glucose or brewery waste in any state of fermentation, or upon any substance in a state of putrefaction or rottenness or of an unhealthy nature, or shall sell or offer for sale cream which has been taken from milk the sale of which has been prohibited, or who shall sell or offer for sale, as cream, an article which shall contain less than the amount of butter-fat as prescribed in this chapter; or if any person shall sell or offer for sale any cheese manufactured from skimmed milk, or from milk that is partly skimmed, without the same being plainly branded, stamped or marked on the side or top of both cheese and package, in a durable manner, in the English language, the words "Skimmed milk cheese," the letters of the words to be not less than one inch in height and one-half inch in width, he shall be fined not less than twenty-five dollars nor more than one hundred dollars, and be liable for double damages to the person or persons upon whom such fraud shall be committed; but the provisions of this section shall not apply to skimmed milk when sold as such and in the manner and subject to the regulations prescribed in this chapter.

SEC. 4990. *What deemed adulterated or impure milk.* For the purposes of this chapter, the addition of water or any other substance or thing to whole milk or skimmed milk or partially skimmed milk is hereby declared an adulteration, and milk which is obtained from animals fed upon waste as defined

in this chapter, or upon any substance of an unhealthy nature, is hereby declared to be impure and unwholesome, and milk which is proved by any reliable method of test or analysis to contain less than twelve and one-half per cent of milk solids to one hundred pounds of milk, or three pounds of butter fat to one hundred pounds of milk, shall be regarded as skimmed or partially skimmed milk, and every article not containing fifteen per cent or more of butter fat shall not be regarded as cream.

SEC. 4991. *Enforcement.* It is hereby made the duty of the dairy commissioner to enforce the provisions of the two preceding sections.

SEC. 4992. *Fraud in lard—from diseased hogs.* All persons or associations that engage in the business of selling lard rendered from swine that have died of disease shall, before selling or offering to sell any such lard, plainly stamp, print or write upon the cask, barrel or other vessel containing it the words, "Lard from hogs which have died of disease;" or, if sold without such cask, barrel or other receptacles, the purchaser shall be informed that the lard is from hogs which have died of disease. For a violation of the provisions of this section he shall be fined not less than five nor exceeding one hundred dollars, or imprisoned in the county jail not exceeding thirty days.

SEC. 4993. *Compound lard—labeling.* No manufacturer or other person shall sell, deliver, prepare, put up, expose or offer for sale any lard, or any article intended for use as lard, which contains any ingredient but the pure fat of healthy swine in any tierce, bucket, pail, package or other vessel or wrapper, or under any label bearing the words "pure," "refined," "family" or either of these words alone or in combination with other words of like import, unless every tierce, bucket, pail, package or vessel, wrapper or label in or under which said article is sold, delivered, prepared, put up, exposed or offered for sale bears on the top or outer sides thereof, in letters not less than one-half inch in length, and plainly exposed to view, the words, "compound lard," and the name and proportion in pound and fractional parts thereof of each ingredient contained therein. Any person violating the provisions of this section shall be fined, for the first offense not less than twenty nor more than fifty dollars, and for each subsequent offense not less than fifty nor more than one hundred dollars.

SEC. 4994. *Canned food—label.* It shall be unlawful for any packer or dealer in hermetically sealed, canned or preserved fruits, vegetables or other articles of food, not including canned or condensed milk or cream, to knowingly offer such canned or preserved articles for sale for consumption in this state, unless the cans or jars which contain the same shall bear the name, address and place of business of the person, firm or corporation that canned or packed the articles so offered, or the name of the wholesale dealer in the state who sells or offers the same for sale, together, in all cases, with the name of the state, city, town or village, where the same were packed plainly printed thereon, preceded by the words "packed at." Such name, address, and place of business shall be plainly printed on the label, together with a mark or term indicating clearly the grade or quality of the articles contained therein.

SEC. 4995. *Soaked goods.* All packers of and dealers in soaked goods, or goods put up from products dried or cured before canning, shall, in addition to complying with the provisions of the preceding section, cause to

be plainly branded on the face of the label in legible type, one-half of an inch in height and three-eighths of an inch in width, the word "soaked."

SEC. 4996. *Penalty.* Any packer or dealer who shall violate any of the provisions of the two preceding sections shall be fined not more than fifty dollars for each offense in the case of retail dealers, and in case of wholesale dealers or packers, not less than five hundred nor more than one thousand dollars for each offense.

SEC. 4997. *Who deemed "packer" or "dealer."* The terms "packer" and "dealer," as used in the three preceding sections, shall include any firm or corporation doing business as a dealer in or packer of the articles mentioned therein.

SEC. 4998. *Information by board of health.* It shall be the duty of any board of health, cognizant of any violation of the provisions of the four preceding sections, to inform the county attorney, whose duty it shall be to institute proceedings against any person who is charged with a violation of such provisions, and in case of a conviction he shall receive twenty-five per cent of the fines actually collected in addition to any salary otherwise provided for.

SEC. 4999. *Seats for female employes.* All employers of females in any mercantile or manufacturing business or occupation shall provide and maintain suitable seats, when practicable, for the use of such female employes, at or beside the counter or work bench where employed, and permit the use thereof by such employes to such extent as the work engaged in may reasonably admit of. Any neglect or refusal to comply with the provisions of this section by any employer shall be punished by a fine not exceeding ten dollars.

SEC. 5078. *What deemed nuisances.* The erecting, continuing or using any building or other place for the exercise of any trade, employment or manufacture which, by occasioning noxious exhalations, offensive smells or other annoyances, becomes injurious and dangerous to the health, comfort or property of individuals or the public; the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place to the prejudice of others; the obstructing or impeding without legal authority the passage of any navigable river, harbor or collection of water; or the corrupting or rendering unwholesome or impure the water of any river, stream or pond, or unlawfully diverting the same from its natural course or state, to the injury or prejudice of others; and the obstructing or incumbering by fences, buildings or otherwise the public roads, private ways, streets, alleys, commons, landing places or burying-grounds, are nuisances.

SEC. 5079. *Manufacture of gunpowder.* If any person carry on the business of manufacturing gunpowder, or of mixing or grinding the composition therefor, in any building within eighty rods of any valuable building erected at the time when such business may be commenced, the building in which such business is thus carried on is a public nuisance.

SEC. 5081. *Penalty—abatement.* Whoever is convicted of erecting, causing or continuing a public or common nuisance as provided in this chapter, (chapter 14, title xxiv), or at common law when the same has not been modified or repealed by statute, where no other punishment therefor is specially provided, shall be fined not exceeding one thousand dollars, and the

court, with or without such fine, may order such nuisance abated, and issue a warrant as hereinafter provided.

SEC. 4976. *Sale of poison without label.* If any apothecary, druggist or other person deliver to another any arsenic, corrosive sublimate, prussic acid or other poisonous liquid or substance without having the word "poison" and the true name thereof written or printed upon a label attached to or affixed upon the vial, box or parcel containing the same, he shall be guilty of a misdemeanor.

SEC. 4977. *Spreading infectious disease.* If any person inoculate himself or any other person or suffer himself to be inoculated with the smallpox within the state, or come within the state with the intent to cause the prevalence or spread of this infectious disease, he shall be imprisoned in the penitentiary not more than three years, or be fined not exceeding one thousand dollars and imprisoned in the county jail not exceeding one year.

SEC. 4978. *Putting infected person on public conveyance.* If any person shall place or put, or aid or abet in placing or putting, any person upon any railroad car, steamboat or other public conveyance, knowing such person to be infected with diphtheria, smallpox or scarlet fever, he shall be fined not more than one hundred dollars or be imprisoned in the county jail not more than thirty days.

SEC. 4980. *Selling drugged liquors.* If any person wilfully sell or keep for sale intoxicating, malt or vinous liquors, which have been adulterated or drugged by admixture with any deleterious or poisonous substance, he shall be fined not exceeding five hundred dollars, or be imprisoned in the penitentiary not exceeding two years.

SEC. 4982. *Adulterating food or liquor.* If any person adulterate for the purpose of sale any substance intended for food, or any wine, spirituous, malt or other liquor intended for drinking, he shall be imprisoned in the county jail not more than one year, or be fined not exceeding three hundred dollars, and the article so adulterated destroyed.

SEC. 4983. *Drugs or medicines.* If any person adulterate for the purpose of sale any drug or medicine in such manner as to lessen the efficacy or change the operation of such drug or medicine, or to make it injurious to health, or sell it knowing that it is thus adulterated, he shall be imprisoned in the county jail not exceeding one year, or be fined not exceeding five hundred dollars, and such adulterated drugs and medicines destroyed.

SEC. 4984. *Other adulteration.* No person shall mix, color, stain or powder, or order or permit any other person to mix, color, stain or powder, any article of food or confections with any ingredient or material so as to render the article injurious to health, with the intent that the same may be sold, and no person shall sell or offer for sale any such articles.

SEC. 4985. *With intent to sell.* No person shall, except for the purpose of compounding in the necessary preparation of medicine, mix, color, stain or powder, or permit any other person to mix, color, stain or powder any drug or medicine with any ingredients or materials, so as to affect injuriously the quality or potency of such drug or medicine, with the intent to sell the same, or shall offer for sale any such drug or medicine.

SEC. 4986. *Labeling.* No person shall mix, color, stain or powder any article of food, drink or medicine, or any article which enters into the composition of food, drink or medicine, with any other ingredient or material,

whether injurious to health or not, for the purpose of gain or profit, or sell or offer for sale the same, or order or permit any other person to sell or offer for sale any article so mixed, colored, stained or powdered, unless the same be so manufactured, used or sold or offered for sale, under its true and appropriate name, and notice that the same is mixed or impure is marked, printed or stamped upon each package, roll, parcel or vessel containing the same, so as to be and remain at all time readily visible, or unless the person purchasing the same is fully informed by the seller of the true names of the ingredients (if other than such as are known by the common name thereof) of such articles at the time of making the sale thereof or offering to sell the same; but nothing in this section shall prevent the use of harmless coloring material used in coloring butter and cheese.

SEC. 4987. *Glucose—skimmed-milk cheese—oleomargarin.* No person shall mix any glucose or grape sugar with syrup or sugar intended for human food, or shall mix or mingle any glucose or grape sugar with any article, without distinctly marking, stamping or labeling the article or the package containing the same with the true and appropriate name of such article, and the percentage in which glucose or grape sugar enters into its composition. Nor shall any person sell or offer for sale, or permit to be sold or offered for sale, any such food, into the composition of which glucose or grape sugar has entered, without at the same time informing the buyer of the fact, and the proportion in which glucose or grape sugar has entered into the composition.

SEC. 4988. *Penalty.* Any person violating any provision of the four preceding sections shall, for the first offense, be fined not less than ten nor more than fifty dollars; for the second offense, not less than twenty-five nor more than one hundred dollars, or imprisoned in the county jail for not more than thirty days; for the third or any subsequent offense, not less than five hundred nor more than one thousand dollars, and imprisoned in the penitentiary not less than one nor more than five years.

XXVII

APPENDIX

CIRCULAR No. 1

Rules and Regulations

For the Protection of Public Health and for the Restriction and Prevention of Contagious Diseases

CONTAGIOUS DISEASES

RULE 1. It shall be the duty of every physician residing or practicing within the limits of any city, town or township to give written notice to the mayor or township clerk (as the case may be) of any case of Asiatic cholera, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, measles, whooping cough, leprosy, or puerperal fever, that he may be called to attend professionally, within twenty-four hours after he shall first visit and ascertain the character of any such disease named herein. In all cases where no physician is in attendance, it shall be the duty of any person having charge of, or being at the head of any family, or having the care or custody of any lodging rooms to give notice in like manner as required of physicians. Every school teacher and school officer who discovers, or who has knowledge of a case of these contagious diseases, shall cause the fact to be immediately reported to the mayor or clerk of a township.

RULE 2. It shall be the duty of the mayor or township clerk (as the case may be), upon receiving written notice of the existence of a case of Asiatic cholera, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina or scarlet rash), to forthwith quarantine the premises, by serving written notice to the occupants thereof, and placing a danger card thereon; and take such measures as may be necessary and proper for the restriction and suppression of such disease; and to investigate all the circumstances attendant upon the occurrence of the same. He shall also make proper provision for care of the sick. Where the disease is measles or whooping cough, the premises shall not be quarantined, but they shall be placarded with the danger card.

And it shall be the further duty of the mayor or township clerk (as the case may be) to disinfect or cause to be disinfected, the premises whereon such quarantined diseases have occurred, together with all infected furniture, bedding, clothing and other articles, as provided by regulations of the State Board of Health.

RULE 3. If any person shall wilfully or maliciously remove or deface, or cause to be removed or defaced, any signal of danger, or cloth or card placed upon the quarantined premises, without the proper authority as provided herein, he shall be prosecuted, as provided by law.

RULE 4. During the existence of any contagious or infectious disease, in any family or household, or place, in any city, town or township, and until after the recovery of the sick and the disinfection of the premises where such disease shall have existed, no person residing in such household, family or place, shall be permitted to attend any public meeting, and no superintendent, teacher or officer of any school shall permit any child or person from any such family, household or place, to attend any school without a permit from the mayor or township clerk (as the case may be), upon the recommendation of the attending physician, showing thorough disinfection of the person, clothing and premises. School teachers, who are boarding in a family in which a contagious disease exists, must at once change their place of boarding and lodging, and change and disinfect their clothing.

QUARANTINE

RULE 5. Quarantine shall be deemed to be:

First—The serving of a written notice upon the family, and the placing upon such conspicuous place, on each building, hall, lodging room, or place wherein exists a contagious disease, as will best protect the public health, a cloth or card not less than eighteen inches square, having imprinted thereon in large letters the word "Quarantine," the name of the disease, and the words: "No person shall be permitted to enter or leave these premises except as provided by law, while it is quarantined, under the penalty provided by law."

Second—Separation of the sick from all persons except those in actual attendance.

Third—That no person shall leave said premises except the attending physician, without a permit therefor signed by the mayor or township clerk (as the case may be).

Fourth—That no article that has been used on or about a person sick with a contagious or infectious disease shall be removed from the sick-room, or from the premises, until the same has been properly disinfected.

RULE 6. Nurses who have been employed to care for persons sick with contagious disease may be released from quarantine when their services are no longer required, upon the order of the mayor, or township clerk (as the case may be). Before leaving the premises there must be thorough disinfection of their person and clothing.

RULE 7. Isolation means the complete exclusion of all other persons from the sick except the nurse and attending physician; that the nurse shall be restrained from going to and from the premises, or mingling with the family; that all well persons shall be prevented from contact with bedding, clothing, food, or other articles that have been used on or about the sick. Where from

necessity the parents or family are nurses, the isolation and quarantine applies to them.

RULE 8. Quarantine shall be established and maintained in each and every case for the period named herein, to-wit:

Scarlet fever—(Scarlatina, scarlet rash), thirty-five days.

Diphtheria—(Membranous croup), thirty-five days.

Smallpox—Forty days.

Asiatic cholera—Twenty-one days.

RULE 9. When a family is quarantined for diphtheria, the head of the family, or bread-winner, may at the discretion of the local board, have the privilege of attending to his regular business, and of going to and from his house only when complying with the following conditions, and the mayor or township clerk (as the case may be) shall issue a permit therefor:

First—He shall change his clothing before going to and leaving his home to go to his place of business.

Second—He shall wash his hands, face, head and beard with a two per cent solution of carbolic acid, each time before leaving his home to go to his place of business.

Third—While in the house he shall not act as nurse nor live in the same room with the sick person.

Fourth—He shall not attend any public meeting, nor attend any place where persons are congregated.

Fifth—This privilege shall not be granted to school teachers, nor to any person whose business brings him in intimate contact with children.

RULE 10. Whenever there is complete recovery or death of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period prescribed herein has not elapsed. *Provided*, that no release of quarantine shall be permitted until at least seventeen days after the recovery or death of the last case, and proper disinfection of person and premises is made as hereinafter provided.

RULE 11. After death or recovery of persons sick from a contagious or infectious disease, the room, furniture, and other contents not to be destroyed, shall be thoroughly disinfected in accordance with regulations made by the State Board of Health.

RULE 12. No order for the release of quarantine shall be made by the mayor, or township clerk (as the case may be), except upon a report from the attending physician stating the number of persons on the quarantined premises sick with the infectious disease in question, their names, ages, and when the disease first appeared in each case, when recovered, and the means, if any, used for disinfection. If the mayor or township clerk (as the case may be), shall find that the regulations of the local board and of the State Board of Health respecting quarantine and disinfection have been complied with the quarantine shall be forthwith released. If quarantine regulations have been complied with, and proper disinfection has not been done, the mayor, or township clerk (as the case may be), shall order it done under the supervision of the health officer or some other competent person, and the quarantine shall be continued until it is done.

RULE 13. No person shall give, lend or sell, or offer for sale, any clothing or other articles liable to convey infection of any contagious disease unless

the same have been disinfected and such disinfection approved by the mayor or township clerk (as the case may be).

RULE 14. When Asiatic cholera, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, leprosy, measles, puerperal fever or any other contagious disease exists in any house or dwelling place of a dealer in, or seller of, milk he shall discontinue, to give, sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor or township clerk (as the case may be), countersigned by the health officer. And no person who attends cows, and does the milking, or who has care of milk vessels, or the sale or distribution of milk, shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have any communication, direct or indirect, with any person who resides in or is an occupant of such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place. Any person, either as principal, agent or employe, who shall violate any of the provisions of this rule shall be prosecuted according to law.

CARE OF THE SICK

RULE 15. A flannel cloth, wrung out of a strong solution of carbolic acid, should be hung constantly across the door leading into the room in which one sick with either disease specified in rule 2 is placed.

RULE 16. The discharges from the throat, nose and mouth are extremely dangerous, and those from the skin, eyes, ears, kidneys and bowels are also dangerous, and remain so for a considerable time. Small pieces of rags should be substituted for handkerchiefs, and after having been once used must be burned immediately.

RULE 17. The discharges from the patient's bowels or bladder must be received into vessels containing a solution of corrosive sublimate which, (being a deadly poison, should be so labeled as to avoid accidents); or a strong solution of carbolic acid or some other disinfectant, and if not buried at once must be thrown into a cesspool or water-closet, after having been thoroughly disinfected, but *never* into a running stream. If buried, it must not be within one hundred feet of any well. All vessels must be kept scrupulously clean and disinfected.

RULE 18. Nurses and attendants must keep themselves and their patients as clean as possible—their own hands frequently washed and disinfected by carbolic acid solution.

The nurses must be few as possible, and they must not unnecessarily communicate with other persons. They must wear only such clothes as may be readily washed, which, when removed, must be placed immediately in boiling water and boiled at least thirty minutes. Neither they, nor any other person, should eat anything in the sick-room, or which has been there. Gargling, or washing the mouth occasionally with a cleansing fluid, is recommended for those exposed to the contagium of the disease.

RULE 19. Food left uneaten by the sick must never be carried where it will infect other persons. It must be burned immediately on removal from the sick-room, and the dishes used washed in boiling water, by themselves—never with other dishes.

SMALLPOX

Vaccination is the only preventive for smallpox. Hence it is important that the vaccination be thoroughly done, with reliable lymph, free from all impurities, and with sufficient frequency.

Immediate vaccination after exposure is important for safety. It should be done, if possible, within five days after exposure.

Every infant should be vaccinated within three months after its birth, unless an educated physician advises to the contrary. Should the first attempt fail, it should be repeated at intervals of a fortnight until a true sore is produced.

Every child should be re-vaccinated before it reaches its *twelfth year*.

DIPHTHERIA

Diphtheria is a most formidable disease, is widely prevalent, and one of the most fatal diseases in this State. It is produced by a specific bacillus which by multiplication produces blood poisoning. It attacks persons of all classes and ages, but most frequently children under sixteen years of age.

In ordinary cases the germ producing diphtheria probably attacks the person by way of the mouth and the air passages.

The period of incubation of diphtheria, or the time from a person's exposure to the disease to his coming down with it, like scarlet fever, varies somewhat—being usually from a few hours to seven or eight days; in some cases it is twelve or fourteen days.

It has been conclusively demonstrated that the germs of diphtheria retain their vitality in dried dust for an indefinite period of time, and that cold—even to freezing, does not affect its vitality. Hence the importance of destroying by burning or thorough disinfection all the discharges.

Its most frequent local manifestations are in the mouth, throat and air passages. When in the mouth, or upper part of the throat only, the disease is, as a rule, less dangerous and fatal, but none the less contagious, than when in the air passages, below the fauces.

Avoid exposure to the disease.

Observe rigidly every measure as given for scarlet fever.

Beware of crowded assemblies in ill-ventilated rooms.

All influences which depress the vital powers, and vitiate the fluids of the body, tend to promote the development and spread of this disease. Among these influences, perhaps the most common and powerful are *impure air* and *impure water*.

RULE 20. Membranous croup must be treated as contagious, and be considered for all sanitary purposes as identical with diphtheria, and all rules applying to the latter apply equally to membranous croup.

SCARLET FEVER

Scarlet fever is one of the most contagious diseases. One attack does not always prevent subsequent attacks. The greatest number of deaths from this disease is of children under ten years of age. Adult persons do sometimes have the disease.

Scarlatina and scarlet rash are identical with scarlet fever—equally dangerous and equally contagious. They are one and the same disease.

Avoid the special contagium of the disease. This is especially important to be observed by children. Children under ten years of age are in much greater danger of death from scarlet fever than are adults, but adult persons often get and spread the disease, and sometimes die from it. Mild cases in adults may thus cause fatal cases among children. Because of these facts it is dangerous for children to go where adult persons go with almost perfect safety to themselves.

It is probable that the contagium of scarlet fever may retain its virulence for some time, and be carried for a long distance in various substances and articles in which it may have found lodgment.

MEASLES

RULE 21. Measles is a highly contagious and often fatal disease, hence is dangerous to the public health, but is not subject to quarantine regulations.

RULE 22. A danger signal must be placed upon the premises in some conspicuous place; all children of the family must be restricted to the home, and all other children excluded.

The specific poison or contagion of measles is in the rash which invades the membranes of the nose, throat, lungs and bowels, before, and often more severely than it invades the skin, so that it is contagious before the eruption appears on the skin.

This disease comes on like what is commonly called "a cold in the head," eyes watery and red; sensitive to light; watery discharge from the nose; fever; hoarse, dry, husky and painful cough; an eruption in the roof of the mouth, with or without sore throat. The eruption does not appear before the second or third day—first on the forehead and face—is in patches, and of dull red color; and the skin has a roughened feel to the touch.

Mothers can do more than all others to prevent the spread of the disease, because they see the first symptoms, and can promptly send the child to bed and isolate it until the true nature of the disease is determined. This early action, a hot bath, and a few days' rest and quiet will promote the safety and recovery of the sick, and also the safety of the other children of the family. In no one of the contagious diseases can the mother give greater aid, and in none is her co-operation more desirable.

WHOOPIING COUGH

Whooping cough is a contagious disease. School children affected with it must be excluded from the schools until entire recovery, and should be isolated from all other children. The premises must be placarded as provided in rule 2.

TYPHOID FEVER

It is the opinion of the best and most experienced sanitarians that typhoid fever is a disease which need not exist. That it is the result of a specific germ. That it is a filth disease—not that it is alone produced by filth. There must be a specific germ, and this germ must, through the mouth, as food or drink, enter the small intestines, where it multiplies enormously, and is thrown off in the excreta, to again multiply under the favoring conditions of moisture and heat. Hence the disposal of the excreta of a typhoid fever patient is of the highest importance. The most dangerous source of infection is from water. The discharges are thrown into a privy vault, on a manure

pile, or on the ground, whence they sink into the earth, through the soil, and often contaminate neighboring wells.

There are many other ways in which water may be contaminated. The soiled clothing of a patient is washed and the water thrown upon the earth near a well, or poured into a leaky drain. Some kinds of food are very absorbent of disease germs. The most notable is milk, which becomes contaminated by being kept too near a patient. Several instances are known where milkmen have carried the germs of this disease in milk kept where the sick were, or by rinsing their cans with contaminated water.

The disease is not considered contagious in the sense that smallpox, measles, scarlet fever, and diphtheria are, yet it has been practically demonstrated that the germs may enter the system through the respiratory tract, as sewer air. Attendants upon those sick are not in danger from contracting the disease directly from the patient. It goes through families because every individual, usually, has been exposed to the producing cause,—the disease germs,—first through contaminated water or food, then the house surroundings.

Protect the water supply from any possible source of contamination. The water supply of cities and towns should be procured from sources where there can be no contamination, immediate or remote, from privies, cess-pools, stables or cemeteries.

Great care should be had to prevent the contamination of the water supply by discharges from the bowels or a person sick with typhoid fever, as by drainage into wells, springs, streams or other water supply, from a privy vault, sewer, drain or cemetery. Privies often drain into wells, unsuspected by those who use the water. Should typhoid discharges pass into such a privy an outbreak of typhoid fever among those using the water from a neighboring well would be likely to occur. If such a well were the source of the general water supply of a city, typhoid fever might soon be epidemic there.

There is good reason to suspect the water of a well whenever a vault is situated within less than a hundred feet of it, particularly if the soil be porous. In numerous instances fluids from excreta have leached into wells from much greater distances; and it has been proved that a well thirty rods from a cemetery received water which had filtered through the soil of the cemetery.

The use of water from a source likely to be infected with excreta from a typhoid fever patient should be promptly stopped. Great care should also be given to the milk supply.

Dangerously contaminated water may be, and often is, found to be clear and colorless, and to have no bad taste.

Keep the premises pure and clean as possible. Of all forms of filth none are so dangerous to houses as the "hole-in-the-ground" privy, and the sink-drains.

All discharges from the patient should be received in a vessel containing a pint or more of a solution of chloride of lime (six ounces of lime to one gallon of water), and kept covered three or four hours, and then buried in the earth, at such distance from wells, springs or streams that they cannot possibly be drained therein. NEVER MINGLE THEM WITH ANY KIND OF FILTH, IN A PRIVY OR ELSEWHERE.

All soiled clothing and bedding soiled with discharges from the patient should be at once removed and placed in a tub and completely covered with solution of chloride of lime or other reliable disinfectant, and kept there until they can be boiled, or put in boiling water as soon as removed from the patient. It is important this should be closely observed, otherwise the substance on the clothing dries, becomes dust, floats in the air and endangers the attendants. It is probable that in this way washerwomen often become infected and have typhoid fever. After this disinfection the clothing may be washed with safety.

During sickness, disinfect at once carefully any spots on floor, carpet or rug accidentally soiled.

There is no necessity for burning the clothing, bedding and bed of a typhoid fever patient even when death occurs, nor for a private funeral, but the coffin must not be opened in any church, hall, place of public assembly or residence.

Strict isolation of the sick is not necessary, but it is wise, for all who can properly do so, to keep away.

After death or recovery, disinfect the sick-room with sulphur fumigation and then wash the floors and woodwork with solution of corrosive sublimate or carbolic acid.

Nurses and others in the family should eat nothing in the room where the patient is, nor of anything that has been there. The food for the family and attendants should be prepared and kept as far as possible from the sick. As boiling will kill all disease germs it is safer, when the disease is in a house, to boil all water and milk just before using.

PUERPERAL FEVER

Puerperal fever is a fearfully fatal disease. Hence, every attendant upon cases of child-birth should, by the use of antiseptic measures, sedulously guard against the occurrence of the disease. The hands and all instruments and appliances should be thoroughly disinfected, and all discharges subject to decomposition and capable of producing septicæmia should be promptly removed and destroyed. The only way to avoid this terrible disease is for every practitioner to recognize his personal responsibility in the matter, and he who does not is guilty of criminal negligence.

LEPROSY

Persons afflicted with well developed leprosy should be required by all local health boards to remain on their own premises, and should not be permitted to mingle with the general public.

TUBERCULOSIS—CONSUMPTION

This is an infectious and therefore a communicable disease, due to a germ—the *bacillus tuberculosis*. The disease is propagated and disseminated by infected meat and milk, and especially by the excretions and sputum of persons affected by it.

INFECTION.—It has been shown that the expired air is not infective. Cornet has said, "The consumptive, in himself, is almost harmless, and only becomes harmful through bad habits." The virus is largely contained in the sputum, which, when dry, is disseminated in the form of dust, and

constitutes the great medium for the transmission of the disease. In the last stages of consumption, the patient is weak, the sputum is expelled improperly; pillows, sheets, handkerchiefs, etc., are soiled. If a male, the beard or mustache is smeared. Even in the hands of the cleanly, without especial precautions, such circumstances all tend to the production, around the patient, of a halo of infected dust maintained by every process of bed making or cleaning, which includes the pernicious habit of "dusting." In the hands of the careless and dirty, the infectivity is of course, greatly aggravated.

It attains its maximum of intensity where the filthy habit of spitting on the floor prevails, especially if it is carpeted.

All rooms frequented by persons suffering from tuberculosis very soon become infected, and consequently dangerous, such as hospitals, jails, poorhouses, etc.; all such rooms where ventilation and disinfection are neglected are very dangerous, as proven by the great number of deaths of those who are confined in these poisoned abodes. Boats and cars on our great lines of travel, without great care being used, become veritable pest houses.

MEANS OF PREVENTION.—*Sunlight* is one of the most powerful agents in destroying the tubercle bacilli. Avoid imperfectly ventilated dwellings, dark, damp, musty rooms. Let your dwellings be light, dry and well ventilated, with an abundance of sunlight. The *sputum* should always be kept moist. In all public places, spittoons, partly filled with water, to which may be added some disinfectant, such as carbolic acid, or a two-per-cent solution of formaldehyde, should be freely distributed, and which all persons who spit should be required to use, if necessary.

Spitting in the streets and in all public places should be prohibited. No child should even be allowed to sleep with a person suffering from tuberculosis, especially if of the pulmonary variety.

Persons suffering from tuberculosis should not drink out of the same cup used by other members of the family, and when traveling should carry his own cup, as the microbes will adhere to the cup in great numbers, and thus endanger others.

As most cities obtain their *water supply* from rivers, whose waters are contaminated with sewage, all water for drinking purposes should be boiled before using, thus preventing typhoid fever, as well as tuberculosis. All *soiled clothing* from tuberculous patients should be thrown into a tub of water, to which some disinfectant has been added, preventing the *sputum* from drying, and thus protecting the washerwoman, as well as all others exposed.

Quarantining those affected, and placarding the premises, are not required in this disease; nor are public funerals prohibited.

THE DEAD

RULE 24. A body dead from smallpox must be immediately wrapped in a cloth saturated with the strongest disinfectant solution, without previous washing, and cremated or buried deep, and no body dead from this disease shall under any circumstances, or any lapse of time, be disinterred.

RULE 25. The body of a person who has died from Asiatic cholera, yellow fever, leprosy, diphtheria (membranous croup), scarlet fever (scarlatina or scarlet rash), must not be removed from the sick-room until it has been

wrapped in a cloth saturated with a solution of corrosive sublimate (one ounce to six gallons of water), and then tightly enclosed in a coffin. The body shall then be cremated or buried immediately without the attendance of any person other than is necessary for the interment thereof, provided that bodies dead from diphtheria, scarlet fever, and puerperal fever, if prepared in accordance with the rules adopted by this board for the transportation of corpses by embalmers holding a license as such from the State Board of Health, may be deposited in a vault or be shipped by a public conveyance.

RULE 26. No public funeral¹ shall be held by any person who has died from either of said diseases named in rules 24 and 25, and no public funeral shall be held in a house, nor on any premises where there is a case of, nor where a death has recently occurred from, either of said diseases.

RULE 27. No person, company, corporation or association having charge of or control of any schoolhouse or church, or of any building, room or place used for school or church purposes, or for any public assembly, shall permit the body of any person dead from any of the contagious or infectious diseases named in these regulations, or any other dangerous contagious disease, except typhoid fever, to be taken into such schoolhouse, church, building, room or place, for the purpose of holding funeral service over such body; and no sexton, undertaker or other person having charge of or direction of the burial of any body dead from any of the said diseases, shall permit the coffin or casket containing such body to be opened; nor shall any child be permitted to act as pallbearer or carrier at any such funeral.

BURIALS

RULE 28. Upon the death of any person within the limits of a city, town or township, it shall be the duty of the physician who was attending at the time of death, or of the coroner, when the case comes under his official jurisdiction, to furnish within twenty-four hours after such death, to the undertaker, or other person superintending the burial of said decedent, a certificate setting forth the full name, age, sex, color, place of death, date and cause of death, and such other facts as may be required by regulations of the State Board of Health and the statutes of the State of Iowa. If any person shall die without a physician in attendance, it shall be the duty of the undertaker, or of any person acquainted with the facts, to report the same to the health officer of the local board of health, who is hereby authorized to give a certificate of death as aforesaid, *provided*, it be not a case requiring the attendance of a coroner.

RULE 29. No sexton or other person or persons, having charge or control of any cemetery, burying place, or tomb, or vault, and no undertaker, or other person or persons, shall inter, entomb, or place in any vault, the dead body of any person, or remove such body from or out of any city, town or township without having procured a certificate of death as provided in rule 28; and it shall be the duty of any undertaker, or other person or persons having charge of the burial or removal of the dead body of any per-

¹ A "public funeral" is deemed to be the indiscriminate attendance of persons not immediately connected with the family of the deceased person, *especially children*; the carrying of a dead body to a church or other public building; or exposure thereof to the public at any place, preceding or during the funeral service. In other words, there must be none present except those absolutely necessary to prepare the body for interment or inter it.

son to deliver said certificate of death forthwith to the clerk of the local board of health.

RULE 30. It shall be the duty of the clerk of a local board of health upon the presentation of a certificate of death, to issue a permit to inter, entomb, or place in a vault the body of the deceased person named in such certificate. *Provided*, a body dead from smallpox, Asiatic cholera, leprosy, yellow fever, typhus fever, or bubonic plague, shall not be deposited in a receiving vault.

RULE 31. If any physician, or any other person, shall knowingly attempt to secrete, or withhold the true character of any of the contagious or infectious diseases specified in these regulations, or shall in any manner whatsoever attempt to deceive or defraud, or who shall make any false statements in making a certificate of cause of death by giving any other than the true cause of such death; or, if the decedent was affected with any such contagious or infectious disease during his last sickness, he shall neglect or refuse to state such fact in such certificate, he shall be liable to the penalty prescribed in section 2573 of the Code.

RULE 32. Upon the presentation of the proper application in accordance with the regulations made by the State Board of Health for the removal of the dead body of a human being out of the limits of a city, town or township, it shall be the duty of the clerk of the local board of health to issue a permit countersigned by the president of the board or mayor (as the case may be) for such removal. *Provided*, that where said body is to be disinterred such application must be accompanied with a disinterment permit from the State Board of Health, but no permit for such removal shall be granted in any case of a body dead from Asiatic cholera, smallpox, leprosy, yellow fever, typhus fever or bubonic plague, or from any sequelæ or complications of said diseases. Bodies dead from diphtheria (membraneous croup), scarlet fever (scarlatina, scarlet rash), may be disinterred only upon a special permit issued by the State Board of Health. No permit for such removal shall be granted in any case whatsoever where the cause of death was a contagious or infectious disease, or any sequelæ of such disease, unless the permit be approved and signed by the president of the local board of health, and also approved by the health officer, nor shall a permit be granted except upon the presentation of the proper certificate of the cause of death.

DISINFECTION

As a result of patient and prolonged investigation two simple means have been determined upon which, if faithfully carried out, would soon rid the world of infections and contagions which, if not checked, become epidemic in character and frightful in mortality. These "means" are QUARANTINE, or isolation of the sick and their nurses, and thorough DISINFECTION—"the former means to let the matured disease die out, and the latter to kill the new germs before they can develop fresh mischief." To these means should be added in the case of smallpox and perhaps some other of the communicable diseases, vaccination or inoculation.

It is important, first, to know what parts of the body are the favorite

breeding places of the germs or micro-organisms that are the cause of infectious diseases and what parts give them off most freely.

As a result of observation and experiment it has been found that—

In cholera they are most numerous in the discharge from the bowels.

Consumption, in the expectoration from the lungs.

Diphtheria (membranous croup), in discharges from mouth, throat and nose.

Measles, in the air passages and skin.

Puerperal fever, in the discharges of the reproductive organs.

Scarlet fever, in the discharges from mouth, throat and nose, and particles from the skin.

Smallpox and varioloid, in the pustules of the body.

Typhoid fever, in the discharges from the bowels.

Whooping cough, in the air passages.

From these sources they get into our bodies by means of the food we eat, the water we drink, the air we breathe, or through broken surfaces of the skin and mucous membranes. Many of these germs are very tenacious of life, and under favoring conditions multiply with wonderful rapidity.

Freezing or drying destroys but few of them—boiling or burning kills them all.

It is important, as well as interesting also, to know, at least approximately, how long the infection lasts in given cases. The following shows the average period of such infection:

Cholera, until complete recovery from the vomiting and purging.

Consumption, as long as the tubercular bacilli are found in the sputa.

Diphtheria, at least three weeks after nose and throat are well.

Measles, from three days before eruption until scurfiness has gone—two to four weeks.

Scarlet fever, from five to six weeks, until the throat is well and desquamation (peeling off) has ceased.

Smallpox, from four to eight weeks, until all the scabs have fallen off.

Typhoid fever, from five to seven weeks, until the fever has disappeared and the diarrhoea relieved.

Whooping cough, until the "whoop" is gone—from four to six weeks.

The following illustrate some of the best known and most reliable methods of caring for those sick with infectious diseases and of destroying the disease-producing germs:

CLEANLINESS

A careful inspection of the premises, inside and out, should be made, including the cellar, well and outhouses, not only with a view of ascertaining the breeding-places of the disease germs, but for the purpose of destroying everything that is a menace to health. Cleanliness of dwellings, closets, cupboards, privies, alleys, person, clothing, and bedding should be enjoined and enforced. Carpets, dirty and dust-laden, and successive layers of paper on the walls, especially when partially detached, form most excellent receptacles for preservation of these disease germs.

DISINFECTION

Disinfection is based upon the fact that all these communicable diseases are caused by a micro-organism—specific in character, whose multiplication

and vitality are dependent upon favoring conditions, that can be successfully combatted by agents denominated *disinfectants*. The terms "antiseptics," "deodorants" and "disinfectants" are, by many, thought to express the same thing. They are widely different.

A DEODORANT has the power of removing offensive odors, but may have no disinfectant powers whatever, and, *vice versa*, the disinfectant may have no deodorizing power. Therefore, the removal of an offensive odor by means of a deodorant does not remove the danger from disease germs already present.

AN ANTISEPTIC is an agent which retards, prevents or arrests putrefaction, decay or fermentation. It may also arrest the development of the germs of disease, and may be used as a preventive of such diseases, but it does not destroy the life of disease germs, and hence cannot be relied upon when such germs are present.

A DISINFECTANT or GERMICIDE is an agent which has the power of destroying germ life.

The following is a list of the most useful disinfectants:

I.—FIRE

Complete destruction of every infected thing of little value.

II.—STEAM

Under pressure, superheated, temperature 221 degrees Fahrenheit. Exposure to this for ten minutes will destroy all germs. Ordinary steam at 212 degrees Fahrenheit will not penetrate sufficiently. Pressure is required to secure penetration. Every well regulated local health department should have ample facilities for the application of "steam" and "dry heat," where all infected articles suitable for such methods of infection that are too valuable to be destroyed should be officially disinfected. For this service a small fee might be charged.

III.—DRY HEAT

Baking in an oven at temperature of 230 degrees Fahrenheit, for two hours. Greater heat than this is liable to destroy the texture of most articles.

IV.—BOILING IN WATER

Actively for half an hour. This will destroy all known germs of disease.

V.—FRESH CHLORIDE OF LIME

Six ounces to one gallon of soft water. Specially useful for faeces, urine and sputa.

VI.—CORROSIVE SUBLIMATE

(Bichloride of mercury.) This is a powerful poison, and when the solution is made it should be colored by some aniline dye or permanganate of potash, so that it may not be mistaken for water. Always use wooden or earthen vessels for holding this solution.

VII.—CARBOLIC ACID

Useful for most purposes.

VIII.—SULPHUR FUMES

RULE 33. When a room and its contents are to be disinfected by sulphur fumigation, heavy woolen clothing, silks, furs, stuffed bed covers, beds and

other articles which cannot be treated with the solution, shall be so arranged in the room as to expose the greatest amount of surface, all pockets turned inside out, and after fumigation they shall be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., shall be cut open, the contents spread out, and thoroughly fumigated. Carpets shall be taken from the floor and so placed as to be thoroughly fumigated. It will add greatly to secure successful fumigation if the room be previously moistened by water spray or a dampened sponge.

RULE 34. If the disease was scarlet fever (scarlatina, scarlet rash) or smallpox, the paper on the walls or ceiling, if any there be, must be removed and completely burned. If the disease was diphtheria, typhoid fever or measles, the paper on the walls must be thoroughly dusted and brushed.

IX.—FORMALDEHYDE

Clothing, bedding, or any infected article can be completely disinfected by immersing for two hours in a two per cent solution of formaldehyde. It is also useful for spraying walls, washing woodwork, furniture, etc.

This solution is made by taking one part by measure of the commercial formaldehyde solution and adding to it thirty parts of water.

GENERAL RULES

The following rules for the use of disinfectants are recommended:

RULE 1. *Precautions to be taken when removing a patient suffering from a contagious disease.* Remove all clothing, linen, coverings or other effects of the patient, and replace them by others which have not been used since the beginning of his illness or which have not remained in the room in which he has been isolated, unless, however, such clothing, linen, coverings or other effects, after having been used by the patient or having remained in his room, have been disinfected in the manner described in rule 4. Provide the patient with rags for receiving his expectorations or evacuations during the transport, and burn these rags or disinfect them according to one of the three methods described in rule 4.

RULE 2. *Disinfection of a house or apartment, and of the furniture and effects contained therein.* First method: Formaldehyde vapor. Second method: Close all outlets of the premises to be disinfected, then fumigate with sulphurous acid by burning for at least six consecutive hours, four pounds of sulphur for each one thousand cubic feet of space.¹ Third

¹Many health boards have discarded the use of sulphur entirely as a disinfectant, because of the careless manner of its use.

To have a successful disinfection, every aperture, hole, joint, etc., must be impermeably closed, and the windows so arranged that they may be opened from the outside, either by a string or by some other contrivance, after disinfection is completed. It must be borne in mind that sulphurous acid gas (vapor of burning sulphur), when inhaled in large quantities, is destructive to life.

To insure the combustion of the sulphur, and as a precaution against fire, place the sulphur, either in powder or in small fragments, in an iron pan which should be placed upon a couple of bricks or stones in a tub partly filled with water. In order to insure the ignition of the sulphur, the surface should be well moistened with alcohol before applying the light. Several twisted slips of newspapers imbedded in the sulphur and projecting above the surface and ignited at their ends will answer the same purpose.

After the room has been subjected to these sulphur fumes twenty-four hours, throw open all doors and windows and air the house well, after which sponge all exposed surfaces with a solution of carbolic acid, two ounces in each gallon of water, and give a final scrubbing with soap and hot water.

method: Remove all the effects, furniture and articles contained in the premises in order to disinfect them in the manner described in rule 4, then thoroughly wash the walls, ceilings and floors with a solution of bi-chloride of mercury; one drachm to a gallon of water.

RULE 3. *Disinfection of a vehicle or boat used in the removal of a patient, or of the body of a patient who has died of a contagious disease.* First method: Remove all cushions, curtains and other accessories, and disinfect them according to one of the methods described in rule 4, then wash out the vehicle or boat with a solution of bi-chloride of mercury, two drachms to one gallon of water. Second method: Put the vehicle in a closed-in place and fumigate with formaldehyde or sulphur as described in rule 2. Wrap the body in a well sewed sheet completely saturated with one of the following solutions: (1) bi-chloride of mercury; two drachms to one gallon of water. (2) Carbolic acid; four ounces to one gallon of water. (3) Chloride of lime; six ounces to one gallon of water.

RULE 4. *Disinfection of everything taken out from the room where the contagious patient is isolated.* **Food:** Burn the remains of the food which has been served to the patient, or sprinkle them with a solution of carbolic acid or bi-chloride of mercury, or sprinkle them with chloride of lime and bury them.

Vessels and utensils: Wash them in boiling water.

Clothing, sheets, napkins, coverings and other linen: (1) Burn them, if of little value; or, (2) Boil them in water for at least half an hour; or, (3) Steep them for four hours in a solution of one drachm of bi-chloride of mercury to one gallon of water; or, (4) Steep them for four hours in a solution of two ounces of carbolic acid to one gallon of water; or, (5) In a two per cent solution of formaldehyde for two hours.

Furniture, mattresses and articles which might be injured by the foregoing methods of disinfection: (1) Expose them for ten minutes to a current of steam in a suitable apparatus; or, (2) Expose them for two hours to dry heat at a temperature of two hundred and thirty degrees Fahrenheit; or, (3) If neither of the two preceding methods can be employed, put them in a well closed room and expose to the fumes of formaldehyde; or of sulphur as described in rule 2 of general rules.

Expectoration and evacuations: Collect them in vessels and mix with them one-half their quantity of one of the following disinfectants, to be left in contact with them for half an hour: (1) Bi-chloride of mercury, two drachms to one gallon of water. (2) Carbolic acid, four ounces to one gallon of water. (3) Powdered chloride of lime. (4) Chloride of lime, six ounces to one gallon of water. (5) Lime milk, prepared as follows: Sprinkle gradually lime of good quality with one-half its weight of water; dilute the powder so obtained with twice its volume of water.¹

RULE 5. *Disinfection of persons and effects before leaving a house which has been quarantined.* Wash, at least, the uncovered portions of the body, the hair and beard with a solution of carbolic acid in the proportion of a tablespoonful to one gallon of water.

Completely change clothing and put on other which has not remained in the infected house, or, if it has remained there, which has been disinfected in the manner described in rule 4.

¹ Lime milk keeps only for a few days, and only when the vessel containing it is kept carefully closed.

RULE 6. *Disinfection of the patient and his effects after his recovery.*
Wash the body with a solution of one tablespoonful of carbolic acid to one gallon of water.

Disinfect as described in rule 4 all clothing and other articles used by him since a period of fifteen days before the beginning of his illness.

RULE 7. *Disinfection of a stable, enclosure, litters, excrements, blood and other contaminated liquids.* **Stable:** First method: Close all outlets, then fumigate with formaldehyde, or sulphur as described in rule 2.

Second method: Wash the walls, ceilings and floors with a solution of bi-chloride of mercury, two drachms to one gallon of water.

Third method: Whitewash with lime the walls, ceilings and floors.

Enclosure: Remove the dirt to a depth of three inches and bury it at least a foot deep.

Whitewash with lime the walls of the enclosure.

Litter, excrements, blood, and other liquids from the sick animal:
Burn them, or bury them a foot deep, at least, after covering them with quicklime.

RULE 8. *To disinfect a privy.* Almost impossible to do it if full. Empty it.

1. Corrosive sublimate, two drachms to one gallon of water.
2. Carbolic acid, four ounces to one gallon of water.
3. Sulphate of copper (bluestone), four ounces to one gallon of water.
4. Chlorinated lime, one half pound to one gallon of water.
5. Fresh slaked lime to cover the contents.
6. A two percent solution of formaldehyde.

Whichever is used must be used in large quantities and added frequently.

In preparing any disinfectant solution, always use soft water, because the chemical constituents of hard water injure the solution. Always use a wooden or earthen vessel for any solution of corrosive sublimate.

RULE 9. *To disinfect rooms and their contents with formaldehyde gas.*

Formaldehyde gas is to be used in preference to any other gaseous disinfectant. In order to obtain desired results the following directions must be closely observed and practiced:

(1) All cracks or openings in the plaster or in the floor or about the door and windows should be calked tight with cotton or with strips of cloth.

(2) The linen, quilts, blankets, carpets, etc., should be stretched out on a line, in order to expose as much surface to the disinfectant as possible. They should not be thrown into a heap. Books should be suspended by their covers so that the pages are all open and freely exposed.

(3) The walls and floor of the room and the articles contained in it should be thoroughly sprayed with water. If masses of matter or sputum are dried down on the floor they should be soaked with water and loosened. No vessel of water should, however, be allowed to remain in the room.

(4) Eight ounces (240 C. C.) of the commercial 40 per cent formaldehyde solution for each one thousand cubic feet of space, to be disinfected, should be used. This solution should be rapidly vaporized, or distilled into the room.

(5) The room thus treated should remain closed for ten hours.

(6) The apparatus used for carrying out these instructions must be approved by this board, upon the recommendation of its bacteriologist.

(7) The so-called "disinfectant" lamps and other apparatus that use wood alcohol for generating formaldehyde are condemned as worthless, and their use cannot be considered as disinfectant.

NOTE—As an Appendix to this circular there is printed Chapter 16, Title XII, the Code, a copy of which will be found elsewhere in this Report.

CIRCULAR No. 2, 1901

REVISED EDITION

REGULATIONS FOR LOCAL BOARDS OF HEALTH IN THE STATE OF IOWA.

ORGANIZATION

The mayor and council of a city or incorporated town, and the trustees of a township are the local board of health. The clerk of a city, recorder of a town, or the clerk of a township is the clerk of the local board.

It is only necessary for the board to elect a president or chairman from its members, and a health officer, to complete the organization of the board.

MEETINGS

Local boards must meet on the first Monday in April and October, and at such other times as may be necessary for the protection of the public health. Notice to all members must be given of all emergent meetings. The board cannot delegate any person or committee to do any act required to be done by the board.

Meetings of the board must be separate and distinct from meetings as trustees. When in session as trustees they must adjourn and reconvene as a local board. This, for the reason that the local board is created, and derives its power, under a different statute than that of trustees. They cannot act as a local board when sitting as trustees. It is important that these distinctions be understood and fully observed, as frequently large expenses are incurred by local boards, and the supreme court says such boards must act in the manner prescribed by statute.

The same rule applies to local boards of cities and towns.

All proceedings of a local board should be kept in a separate record and should embrace every action of the board.

COMPENSATION

The statute creating local boards makes no provision for the compensation of such boards, but it is provided in the Code that township trustees shall receive "for each day's services of eight hours necessarily engaged in official business, to be paid out of the county treasury, two dollars each." When engaged in the duties of a local board, the trustees are engaged in official duties imposed by the statute. The same rule applies to the clerk.

The statute provides that the local board shall fix the compensation of all persons employed by them in the execution of the health laws, of their own regulations, and regulations of State Board. The presumption of law is that these expenses are to be paid in the same manner as other expenses of the township. Whoever is employed, the employment must be by the local board, not by any member of the board, nor by a committee of the board.¹

EXPENSES

The statute says all expenses incurred in the enforcement of the health law "shall be paid by the town, city, or township; in either case all claims to be presented and audited as other demands. In the case of townships the trustees shall certify the amount required to pay such expenses to the board of supervisors of the county, and it shall advance the same, and at the time it levies the general taxes, shall levy on the property of such township a sufficient tax to reimburse the county, which, when collected, shall be paid to and belong to the county."

REGULATIONS

Local boards must adopt such regulations as are necessary for the protection of their jurisdiction, regarding nuisances, sources of filth, and causes of sickness, etc., and also enforce regulations made by the State Board of Health.

Regulations when adopted must be put on record and public notice given by publication or posting. The State Board has prepared regulations suitable for posting in townships, which will be sent to local boards upon a request for circular No. 7.

It is not sufficient for a local board by resolution to merely adopt regulations of the State Board. The specific regulations must be named, a copy thereof marked for identification, and filed in the clerk's office, and the facts put on record.

To render one liable for violation of an order of a board of health there must be legal evidence that the order was made by the board. The mere service of notice is no evidence of the action of the board. There must be record evidence of the action of the board regarding the subject-matter, as the removal of a nuisance, or the incurring of expenses.

It is the duty of local boards as public officers to provide all possible protection to the lives and health of the people of their jurisdiction. The statute says they shall do this. For neglect of official duty they are liable to heavy penalty. Not only this, the courts have established the rule that the corporation of which they are such officers is liable to damages for injuries sustained by reason of neglect of official duty of such officers. Every stagnant body of water, with green slime throwing off noxious vapors and disease; every filthy, stinking alley with accumulated garbage and rotting manure; filthy stock yards; noxious waste from creameries; every cesspool and privy exhaling disease; every knacker plant, or every slaughter house, comes within the purview of the duties of a local board. A city or town may enforce regulations made by the local board of health by the enactment of an ordinance providing a penalty for any violation of such regulations.

¹ The board of supervisors does not have the right to regulate the fees and charges of persons employed by the local boards of health.—*Tweedy v. Fremont County*, 68 N. W., 921.

Copies of such ordinance may be procured upon application to the secretary for circular No. 4.

JURISDICTION

Local boards have no jurisdiction beyond the limits of the territory of which they are the board. Where a town is within a township the township board has no jurisdiction within the town, except in a case when the town aforesaid owns and operates a cemetery within the township aforesaid, in which case the town has jurisdiction over said cemetery. It may quarantine against the town whenever deemed necessary. When a city or town includes an entire township, the local board of the city or town has superior jurisdiction.

While certain duties are devolved upon the mayor and clerk, under the law, these officers are subject to the general powers of the local board.

QUARANTINE

Quarantine applies to all institutions, public or private, city, county or state.

All expenses incurred by reason of quarantine must be by direct order of the local board, when in session, or by some regulation of the board duly made and recorded.

HEALTH OFFICER

The statute requires every local board of health to appoint a "competent physician" as health officer. The provision is mandatory, not directory. The local board has no discretion in the matter; the statute says they *shall* appoint. The presumption of law is that he is to be the sanitary adviser and counsel of the board.

He should be competent to diagnose correctly all contagious and infectious diseases. He should be a person of practical, professional experience, and of good judgment and discretion. He should be the most "competent physician" obtainable, as the statute makes competency the required qualification. It makes no difference to what school of medicine he belongs.

A physician who is a member of a local board may be also the health officer of the board, but he must be elected to the office.

The powers and duties of a health officer must be previously given by a local board when in session, and must be of record. He has power to do whatever is directed by the local board, not in contravention of the statute, the rules and regulations of the State Board, or the lawful powers of the local board.

He is an advisory counsel of a local board in sanitary matters, and not an executive officer, except when made such by formal action of the local board.

It is not his duty to attend persons quarantined for contagious diseases. The sick, when quarantined, may employ whom they please to attend them during sickness, except in the case of paupers, as provided in the Code, and neither the health officer nor local board can interfere. It is not his duty to assist an undertaker in preparing for burial the body of a person dead from contagious disease, unless so specially directed by the local board as a protective measure.

It is not his duty to verify the statement of an attending physician as to suspected cases of contagious disease. Whenever well authenticated symp-

toms lead to a certainty that the attending physician is in error in diagnosis, it is the duty of the board to direct the health officer, or other person, to visit the case, but such visit should not be made except after notice to the attending physician, and a courteous recognition of his professional rights.

It is not his duty to put up danger signals. That should be done by some police officer, constable or specially-delegated officer.

It is not his duty to disinfect quarantined premises. That should be done under the supervision of the attending physician, or some member of the board, acting by advice of the health officer. Upon the occurrence of small-pox within his jurisdiction, he must report the same by telegraph—if there be no telegraph, by mail—to the State Board, and this, whether the case be mild or severe, or modified by vaccination.

It is his duty to study the cause, rise, progress and decline of any epidemic disease in his jurisdiction, and report the same to the State Board, on subsidence of the disease.

It is his duty, by statute, to make a report to the state board on blank forms furnished by the State Board, of statistics concerning the jurisdiction of which he is health officer. If he is the health officer for a township and a city or town within a township, or more than one township, he must make a separate report for each board, just as distinct and separate as though made by different persons.

He must be a lawful physician—holding a certificate of authority to practice medicine from the State Board of Medical Examiners. The State Board of Health will not recognize any but lawful physicians as health officers of local boards. It is doubtful if a local board can appropriate public money to pay for the services of a person not lawfully qualified to perform the service.

He is a public officer and must take the oath required of every civil officer before entering upon the duties of his office. He must be a citizen of the State, but not necessarily an elector or voter of the place where he is elected; hence he may be the health officer of more than one local board.

No compensation is fixed by statute. That must be done by the local board. If given an annual salary, such salary will be deemed by law in full compensation for all services rendered in connection with the duties of his office, unless the board otherwise provide. The presumption of law is that his compensation will be paid in the same manner as other expenses of the city or township, except in cases of quarantine of contagious diseases, the expenses of which are to be paid by the county if the persons quarantined are unable to pay.

NUISANCES

Local boards must make such regulations respecting nuisances, sources of filth, and causes of sickness as are necessary for the protection of the public health.

While the statute gives the board the discretionary exercise of judgment as to what they may deem necessary for the public health, the intent and purpose of the whole statute is the protection of the public health, and it is mandatory. The statutes have defined clearly what are nuisances.¹

¹ Code, section 5078: "The erecting, continuing or using any building or other place for the exercise of any trade, employment or manufacture, which, by occasioning noxious exhalations, offensive smells or other annoyances, becomes injurious and dangerous to the health.

A nuisance is anything done or permitted which injures or annoys another in the enjoyment of his legal rights. Every person has the legal right to the fullest enjoyment of his life and health. Therefore, anything which injures or annoys the public in the enjoyment of life or health is a nuisance, which it is the duty of a local board to abate. With nuisances

comfort or property of individuals or the public; *the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place, to the prejudice of others*; the obstructing or impeding without legal authority the passage of any navigable river, harbor or collection of water; or the corrupting or rendering unwholesome or impure the water of any river, stream or pond; * * * are nuisances."

"Where an indictment charged that the defendant 'unlawfully and injuriously did erect, continue and use a certain enclosure, or pen, in which cattle and hogs were confined, fed and watered, and the excrement, decayed food, slops and other filth were retained,' whereby were occasioned 'noxious exhalations and offensive smells, greatly corrupting and infesting the air; and other annoyances dangerous to the public health, comfort and property of the good people residing in that immediate neighborhood,' it was held that the acts charged constituted a public, indictable nuisance, both under this section (4089) of the statute, and at the common law."—*The State v. Kaster*, 35 Iowa Supreme Court Reports, 221.

Any use of property, or any trade, that corrupts the atmosphere with smoke, noxious vapors, noisome smells, dust, or other substances or gases producing injury to property or to health, or impairing the comfortable enjoyment of property, is a nuisance.—Wood on Nuisances, page 574, section 531.

Where defendant erected stock yards so near plaintiff's dwelling, and so kept them, that the odors therefrom were not only an annoyance, but were unwholesome, threatening the health of plaintiff and his family, held that the defendant could not escape liability on the ground that the yards were necessary to the operations of the road, and that the odors could not be avoided.—*Shively v. Cedar Rapids, I. F. & N. W. R. R. Co.*, 74 Iowa, 170.

Meeker v. Rensselaer, 14 Wend., 397.

In the case of *City of Salem v. Eastern Railroad Company*, the supreme court of Massachusetts (98, page 443) under a statute which is a verbatim copy of the Iowa statute, held that the adjudication of the board that a nuisance exists is conclusive, and no appeal lies therefrom. The board should keep an accurate record of their proceedings, and all adjudications should appear therein in clear and distinct language. It is not the purpose of the order to direct in what mode the person should proceed to remove the nuisance. It should direct the end to be accomplished, leaving the party to adopt any effectual mode he may choose. If the owner or occupant neglects to remove the nuisance, the board are at liberty to enter upon private property, where it exists, and take such measures as they may see fit for its removal.

The court further says, in relation to boards of health: "Their action is intended to be prompt and summary. They are clothed with extraordinary powers for the protection of the community from noxious influences affecting life and health, and it is important that their proceedings should be embarrassed and delayed as little as possible by the necessary observances of formalities. Although notice and opportunity to be heard upon matters affecting private interests ought always to be given when practicable, yet the nature and object of those proceedings are such that it is deemed to be most for the general good that notice should not be essential to the right of the board to act for the public safety. Delay for the purpose of giving notice, involving either of public notice or of inquiry to ascertain who are the parties whose interests will be affected, and further delay for such hearings as the parties may think necessary for the protection of their interests, might defeat all beneficial results from an attempt to exercise the powers conferred upon boards of health. The necessity of the case, and the importance of the public interests at stake, justify the omission of notice to the individual.

"Notice must be given of general regulations prescribed by the board before parties can be held in default for a disregard of their requirements. No previous notice to parties so to be affected by them is necessary. They belong to that class of police regulations to which all individual rights of property are held subject, whether established directly by enactments of the legislature, or by its authority through boards of local administration."

Shuster v. Met. Board of Health, 49 Barb. (N. Y. S. C.), 450; Wood on Nuisances, sections 494, 504, 525.

A slaughter house in a city or public place, or near a highway, or where numerous persons reside, is *prima facie* a nuisance.—*Bushnell v. Robeson & Co.*, 62 Iowa, 540.

Wood on Nuisances, section 837.

affecting only private interests, local boards have nothing to do, as where A complains that a schoolhouse privy, situated just across the street from his residence, is unsightly. The order of the local board for its removal must be upon the ground that it is dangerous to the public health.

If a local board of health finds any decomposing or offensive matter upon private property, which, in their opinion, is injurious to the public health; or if a local board of health at one of its meetings should, upon investigation, find and determine that the emptying of refuse matter into a river, or into any passage-way which conducted it into the river, was causing a nuisance dangerous to health and life, or that such refuse matter was being disposed of in any other such way as to cause a nuisance, the board must make a record of that fact and order the owner of the property, place or building, to remove the nuisance or cause of sickness within twenty-four hours, or such other time as is deemed reasonable. After notice is served in accordance with the statute, if the owner or occupant fails to comply with such order, then the board can lawfully make another order directing the removal of the nuisance or cause of sickness, and provide that the expense thereof shall be paid by the owner, occupant or other person who caused or permitted the objectionable conditions. The local board can then take such reasonable steps as are deemed proper to summarily and promptly execute this order, and the expense of the same can afterwards be recovered against the party whose duty it was in the first instance to remove the nuisance or cause of sickness.

This work of removal or prevention must be executed with as little damage as possible to the owner of the property or others, consistent with the imperative demand of safety to the lives and health of the inhabitants. But the controlling motive must be this safety, and to the extent that the objectionable conditions threaten it. To that extent they must be removed or prevented, whatever the consequences to individuals may be.

The board of health should be careful to keep a full and accurate record of its proceedings. All jurisdictional requirements should be stated in the record, and the finding of facts should be clearly stated therein. The adjudications of the board should be stated in unmistakable language.

The power of the board of health is extraordinary, and its exercise may result disastrously to individual interest; but the emergencies that confront the board are very great, involving the destruction of health and life. In this conflict individual interest must yield, and the public welfare have sway.

It is undoubtedly the intention of the Code contained in section 2573 to leave it to the owner or occupant to cause this removal or prevention with as little injury to himself as possible, and to leave it to him to determine what method he will adopt, requiring only that this method shall be effectual. If he fails to act within the time designated, then the board must act.

A local board has no authority to order a business closed or stopped. The power is vested in the courts, but has power to require that it shall be conducted in a clean and wholesome manner, and not offensive to the public.

SCHOOLS

When a contagious disease appears in a community the schools should not be closed unless the sick outnumber the well, and the school becomes decimated. By closing the schools the children are thrown together by inter-

visiting and play, and the risk of exposure thereby is greatly increased. By continuing the school and isolating the sick the danger of exposure is greatly decreased.

If a pupil is affected the teacher must immediately remove such pupil from the school, and unless the other children in the family go from home to live, they, also, must be excluded from the school. The exclusion of pupils is a part of the quarantine regulations, with which neither the attending physician, school directors, nor even health officers can interfere.

Should any pupil be attacked with any infectious disease in any school-room all the pupils in such room shall at once be dismissed and the school-room remain closed until thoroughly disinfected.

If a teacher is boarding in a family wherein is a contagious disease he must immediately change his boarding place.

While schoolhouses are by law in the control of school directors, it is within the power of a local board of health to prohibit their use whenever it is deemed necessary for the protection of the public health, and it is their duty to so prohibit their use. For more specific directions relative to schools ask the secretary of the State Board of Health for circular No. 3.

QUARANTINE EXPENSES

Local boards must provide by regulations for furnishing supplies, nurses, medical attendants, etc., where quarantine is established, otherwise they will fail to receive the expense thereof from the county. The mayor, clerk or health officer have no authority to incur such expense.

If a local board has neglected to make such provision and a contagious disease appears in their jurisdiction, the board must convene immediately and make the necessary provision for the care of the sick, nurses, etc., and make such orders as are necessary for the suppression of the disease. This cannot be done by any member of the board nor by a committee of the board, except upon direct order of the board. The supreme court has so decided.

PENALTY

The Code, section 2573, makes the following provision for violation of regulations of the State Board and of local boards:

"Any person being notified to remove any nuisance, source of filth or cause of sickness, as in this chapter provided, who fails, neglects or refuses to do so after the time fixed in such notice, or knowingly fails, neglects or refuses to comply with and obey any order, rule or regulation of the State or local board of health, or any provision of this chapter, after notice thereof has been given as herein provided, shall forfeit and pay the sum of twenty dollars for each day he refuses such obedience, or for each day he knowingly fails, neglects or refuses to obey such rule or regulation, or knowingly violates any provision of this chapter, to be recovered in an action in the name of the clerk of the board, and, when collected, to be paid to the clerk of the town, city or township, as the case may be, and for its benefit; and, in addition thereto, anyone so offending, or knowingly exposing another to infection from any contagious disease, or knowingly subjecting another to the danger of contracting such disease from a child or other irresponsible person, shall be liable for all damages resulting therefrom, and guilty of a misdemeanor."

PROSECUTIONS

The attorney-general gives it as his opinion that under the statute it is a criminal offense for any person to violate regulations and rules made by a local board. This includes disobedience to quarantine lawfully established. It is also the duty of the county attorney to give advice and council to the local boards of health, and to prosecute persons who violate the rules of the board of health and refuse to obey the order of quarantine. The proceedings to impose a fine should be brought by information in the name of the State, it being a criminal action.

When information is filed, notice must be given the county attorney of the time and place of hearing.

The Code has the following as to the duty of local boards in relation to the rules and regulations of the State Board:

SEC. 2572. Local boards of health shall obey and enforce the rules and regulations of the State Board; and peace and police officers within their respective jurisdictions, when called upon to do so by the local boards, shall execute the orders of such board.

REPRINT FROM CIRCULAR 3

The following, in regard to the right of the State Board of Health to require as a condition of attendance upon the schools of Iowa, satisfactory evidence of successful vaccination, will be of interest.

A local newspaper contained this item:

The question of compulsory vaccination has at last been carried into the courts and there decided. The circumstances are of interest. The local board of health of Shelby, in compliance with the directions of the State Board of Health, ordered all the scholars in the Shelby public schools to be vaccinated on or before January 1, 1895, or be excluded from the schools. About two hundred and fifty children complied with the order of the local board, while the parents of some ten of the pupils put on war paint and refused to have their children vaccinated, whereupon they were duly sent home and forbidden to re-enter school, until they should be vaccinated. Their parents carried it into the courts, suing out an injunction against the local board of health of the town of Shelby, and on last Saturday the local board and their opponents appeared in court at Harlan, before Judge Macy, who, after hearing the evidence, sustained the local board of health of the town of Shelby.

This, we believe, is the first case in the state of Iowa, and the fight was made on the constitutionality of the regulations of the State Board of Health as having the power to exclude children from school who refuse to be vaccinated. This is a very important decision and will tend to quiet those who are always ready to oppose good health regulations.

A request was made by the secretary, of Judge Macy, for a copy of his opinion in the case above cited, to which he replied as follows:

HARLAN, IOWA, February 4, 1895.

Dr. J. F. Kennedy, Des Moines, Iowa:

MY DEAR SIR—Your letter at hand. I can only hurriedly answer. The opinion I rendered was oral, and I have not before me even the notes and citations I used. I have no doubt about the points involved. The legislature provides for the State Board of Health, and committed to it general powers with regard to health protection. That legislation does not contravene the principle of constitutional law that the right of authority of the legislature to pass or enact laws does not give that body authority to delegate the power to another body or branch of the government. The protection of health and morals of the citizens comes within police regulation, and the State Board can enact rules and regulations upon the matter of preserving the public health, and if they are not oppressive, whimsical, discriminating, but reasonable and just, and apply to all, will be sustained.

N. W. MACY.

When the State Board in November, 1899, ordered general vaccination, and re-vaccination when deemed necessary, attorney-general Milton Remley

furnished the secretary the following, as his views from a legal standpoint of the right of the State Board to make such an order, and of the duty of local boards to enforce it:

It is claimed that compulsory vaccination is an invasion of the person of the individual. People submit to laws imposing burdens in the form of taxation and restraints upon their conduct or action with comparative equanimity, but when the enforcement of a law touches their person they are disposed to consider it a personal indignity. In such cases resentment and indignation often arise to the exclusion of reason and judgment. The power of the State to require all persons to be vaccinated, when the necessity therefor arises, is the same power as that exercised when whole blocks of buildings are torn down or blown up to stop the spread of a conflagration. It is the same kind of power as that which arrests and confines an insane person, or one who, for any cause, is a menace to others. It is called the police power of the State. "Public safety is the supreme law," is a maxim left us by the Romans. In times of danger to the public all things must yield to the demands of public welfare. No one having the smallpox would be permitted to parade the populous streets, spreading contagion everywhere. If under no statute law he could be restrained, he would be restrained by force; his life even would be taken, if necessary, under the law of self-protection or public safety, which is instinctively recognized by every human being.

The power to restrain one already infected with the disease, and the power to compel one to an act which will prevent him from becoming infected, are one and the same—only differing in degrees.

The power of a state to require all persons to be vaccinated, when danger threaten, has not been directly determined by any court, to my knowledge, except in the case of *Morris v. City of Columbus*, by the supreme court of Georgia, which was decided a little more than a year ago. The constitutionality of the law was upheld by the court in a very able opinion, in which the principles of the law are clearly stated, and the authorities are cited and reviewed. Other courts have upheld laws involving the same principle and powers, but space will not permit me to review them. It will well pay any one interested in the subject to read the *Morris* case. It is reported in 30 S. E. R., 850.

The State of Iowa has not authorized city councils to determine when the necessity arises for vaccination of the public generally, or the people of a city, as has the state of Georgia. Nor has it empowered school boards to require the vaccination of the pupils as have Pennsylvania and some other states. The duty of determining what is necessary to be done to preserve, to protect public health, and when it is to be done, has been entrusted by the legislature to the boards of health, state and local. From the necessity of the case such matters must be left to the local authorities to a large extent. It is competent for the legislature to clothe boards of health or town councils, or whatever agents may be selected, or by what name they may be called, with power to take whatever steps the emergency or conditions demand to protect the public health. The legislature of this state has given this power to the boards of health, and I am thoroughly convinced that every reasonable order made by the boards of health will be upheld by the courts, even to the extent of requiring all persons not immune, in a community threatened with the dread scourge, to be vaccinated. The reasonableness of any order depends, of course, upon the necessity for it, the proximity of the danger. Many considerations enter into the problem of what is reasonable. Care should, in all cases, be taken not to exceed the bounds of reasonableness. But when the necessity arises the matter should be taken hold of kindly, but with a firm hand and in a heroic manner, remembering that "*salus populi suprema est lex.*"

CIRCULAR No. 3. 1901

REVISED EDITION

RESTRICTION AND PREVENTION OF CONTAGIOUS DISEASES IN THE PUBLIC AND PRIVATE SCHOOLS OF IOWA

OFFICE OF THE STATE BOARD OF HEALTH, }
DES MOINES }

At a meeting of the Iowa State Board of Health, held March 24, 1898, the following rules, as revised by the committee on publications and papers,

were adopted for the restriction and prevention of contagious diseases in the public and private schools of this state, pursuant to authority vested by chapter 16, title 12 of the Code, and the same are binding upon boards of health, school boards, teachers, and all persons throughout the state.

By order of the board,

J. F. KENNEDY,
Secretary.

J. I. GIBSON,
President.

RULES

RULE 1. Every person entering any public or private school of Iowa must give satisfactory evidence of protection by vaccination.

RULE 2. The fact of vaccination and protection must be entered with each name on the school record, and on transfer and promotion lists.

Order of Vaccination—At a meeting of the State Board of Health, February 2, 1894, for the purpose of preserving and improving the public health and of preventing the spread of the disease known as smallpox, the following rules and regulations were ordered:

First—All persons in this state over the age of one year, who have not been vaccinated, or who in the opinion of the local board of health of the district or jurisdiction in which such persons reside or are found, do not furnish satisfactory evidence of protection from smallpox, are hereby ordered to be vaccinated.

Second—Local boards of health and all officers who compose said boards, and all sheriffs, constables, city marshals and police officers, within their respective jurisdictions, are hereby directed to enforce the foregoing order as soon as practicable, and so far as said order shall apply to the pupils of any public or private school or to the teachers thereof. The officers of the school district in which such school is held shall also require its enforcement.

RULE 3. Persons affected with diphtheria (membranous croup), measles, mumps, rotheln, scarlet fever (scarlatina, scarlet rash), whooping cough, smallpox, Asiatic cholera, typhoid fever, or leprosy, must be excluded from school until upon a certificate from the attending physician, showing complete recovery, thorough disinfection of his or her person and clothing, and the disinfection of the home, the mayor or township clerk, as the case may be, issues a written permit for their readmission, after the quarantine rules of this board have been first complied with. All other persons from families where such diseases exist shall also be excluded from the schools until they are furnished with a permit as above required.

RULE 4. Every school teacher who discovers among his or her pupils a case of these contagious diseases, must immediately report the fact to the mayor or township clerk, as the case may be; also, to the superintendent or principal of the school, and to the parents of the children, and must send the pupils thus afflicted to their homes at once. Teachers must not visit premises wherein are children sick with any contagious disease, and must carefully avoid exposure to such diseases.

RULE 5. If a person is ascertained to have attended school when affected with either of these contagious diseases, the local board of health shall imme-

diately close the room wherein such person attended until it has been properly disinfected.

In case of an outbreak of smallpox in any community, or a threatened outbreak, every child attending the schools and every *teacher* must be examined relative to having been successfully vaccinated, and if they have not been vaccinated they must be excluded from the schools until so protected. This vaccination should include the community generally, as far as possible.

EARLY SYMPTOMS OF CONTAGIOUS DISEASE

Smallpox—This disease, though highly contagious, is comparatively rare, owing to the fact that vaccination is a safe preventive. Its early symptoms are so nearly similar to those of some other diseases that only an experienced physician can properly diagnose it. Vaccination and re-vaccination are better in this disease than rules for diagnosis or for restriction.

Scarlet Fever—This disease is also called *scarlatina* and *scarlet rash*, both of which names are misleading, inasmuch as they are often used to express some harmless form of eruption. They are both accommodating terms for, and are identical with, scarlet fever. The disease is often sudden in its attack. There are nausea; vomiting; hot, dry skin; full, rapid pulse; high temperature; headache; flushed face; whitish coated tongue, with little red projections through the coating; very fine rash in the roof of the mouth; sore throat and pain in swallowing. Rash usually appears within the first twenty-four hours, first about the neck and face, and thence extends over the entire body. It is light red, uniformly smooth, and is followed by a white line, or mark, if the finger is passed over it. These symptoms may not all be present, nor in the order named. The characteristic symptoms are: Vomiting; high fever, setting in early; sore throat; whitish furred tongue; and appearance of fine rash within twenty-four hours.

Measles—The onset of this disease is similar to what is commonly called a "cold in the head." Eyes watery and red; watery discharge from the nose; fever; hoarse, dry, husky and painful cough; and eruption in the roof of the mouth, with or without sore throat. The eruption does not appear before the second or third day—first in the forehead and face—is in patches, and of a dull red color; and the skin has a roughened feel to the touch. The earliest initial symptoms are: Watery eyes, sensitive to the light; discharge from the nostrils; sneezing; rough, dry cough, with pain under the breast bone; the late appearance of the eruption, its occurring in patches, with interspersed spaces of healthy skin, and the roughened feel and swollen appearance of the skin.

Rotheln, or German Measles—This disease in its early symptoms occupies an intermediate place between scarlet fever and measles, without possessing the dangers of either. Hence it is better to mistake it for scarlet fever or measles and treat it as such than to mistake either measles or scarlet fever for rotheln, and treat them as such. It is highly contagious, and children so affected must be sent home, and only allowed to re-enter the school on a certificate, as required in rule 3. It should be treated by isolation and disinfection. The common symptoms are sore throat; watery eyes and nostrils; slight fever; an eruption appearing early on the neck and upper part of chest, rapidly spreading over the body and soon subsiding.

There is very little constitutional disturbance. Its characteristic symptoms are. Moderate amount of fever; early appearance of a fine rash resembling the so-called "scarlet rash," with early disappearance of same, and more or less swelling of the glands of the neck.

Diphtheria—This disease is especially characterized by precursory symptoms. There is more or less languor; impaired appetite; slight fever and restlessness for some days before the throat symptoms manifest themselves; and if diphtheria is prevalent in a community a child manifesting such symptoms should receive prompt attention and should excite serious apprehensions. In addition to these premonitory symptoms, the pulse is rapid and rather feeble; the throat and soft palate are red and moderately swollen; there is pain on swallowing fluids rather more than solids; putrid breath and the appearance upon the tonsils of whitish or ash-colored spots, which rapidly coalesce and form a thick, leathery, ash-colored membrane. If the air passages become involved, there is a croupous cough and breathing. The characteristic symptoms of diphtheria are: Languor and debility; redness, soreness and swelling of the throat; fetid breath; ash-colored spots running together, rapid, feeble pulse; and croupous symptoms if there is extension of the membrane into the air passages.

Membranous Croup so closely resembles diphtheria when the latter invades the air passages that the Board has included it in the rules and regulations for the restriction and prevention of diphtheria.

Whooping Cough—Whooping cough is an infectious disease. A pupil affected with it must be excluded from the schools until entire recovery. There is no necessity for quarantining the adult members of the family, or the premises, which should be placarded, and the children excluded from the schools and from public gatherings.

Typhoid Fever—This disease closely resembles diphtheria in the initial symptoms. There is languor, a tired feeling lasting many days; headache; wakefulness; frequent diarrhoea; tongue red, especially at tip and edges; tendency to bleeding at the nose; with fever, which gradually increases toward evening. There are no throat symptoms.

Typhoid fever is deemed to be the result of a special contagion present in the excreta of typhoid fever patients. The disease germ is multiplied after being thrown from the bowels, and finds its way into the intestinal track through water or food. The patient should be isolated from the well and all discharges be thoroughly disinfected and buried. The premises need not be quarantined.

Upon the outbreak of diphtheria or typhoid fever, the teacher, especially in country districts where the local board of health is too often ignorant or neglectful of its duty, should suggest, and, so far as possible, insist upon a careful inquiry into the source and healthfulness of the water supply. In nearly all such cases the drinking water is found contaminated, and its early discovery may prevent many other cases occurring.

Isolation—Isolation means the complete exclusion of all other persons from the sick except the nurse and attending physician; that the nurse shall be restrained from going to and from the premises, or mingling with the family; that all well persons shall be prevented from contact with bedding, clothing, food or other articles that have been used on or about the

sick. Where from necessity the parents or family are nurses, the isolation and quarantine applies to them.

When a contagious disease appears in a community the schools should not be closed unless the sick outnumber the well, and the school becomes decimated. By closing the schools the children are thrown together by intervisiting and play, and the risk of exposure thereby is greatly increased.

By continuing the school and isolating the sick the danger of exposure is greatly decreased.

If a pupil is affected the teacher must immediately remove such pupil from the school, and unless the other children in the family go from home to live, they, also, must be excluded from the school. The exclusion of pupils is a part of the quarantine regulations, with which neither the attending physician, school directors, nor even health officers can interfere.

Should any pupil be attacked with any infectious disease in any school-room all the pupils in such room shall at once be dismissed and the school-room remained closed until thoroughly disinfected.

If a teacher is boarding in a family wherein is a contagious disease he must immediately change his boarding place.

VACCINATION AND THE LAW

The following, in regard to the right of the state board of health to require as a condition of attendance upon the schools of Iowa, satisfactory evidence of successful vaccination, will be of interest.

A local newspaper contained this item:

The question of compulsory vaccination has at last been carried into the courts and there decided. The circumstances are of interest. The local board of health of Shelby, in compliance with the directions of the state board of health, ordered all the scholars in the Shelby public schools to be vaccinated on or before January 1, 1895, or be excluded from the schools. About two hundred and fifty children complied with the order of the local board, while the parents of some ten of the pupils put on war paint and refused to have their children vaccinated, whereupon they were duly sent home and forbidden to re-enter school until they should be vaccinated. Their parents carried it into the courts, suing out an injunction against the local board of health of the town of Shelby, and on last Saturday the local board and their opponents appeared in court at Harlan, before Judge Macy, who, after hearing the evidence, sustained the local board of health of the town of Shelby.

This, we believe, is the first case in the state of Iowa, and the fight was made on the constitutionality of the regulations of the State Board of Health as having the power to exclude children from school who refuse to be vaccinated. This is a very important decision, and will tend to quiet those who are always ready to oppose good health regulations.

A request was made by the secretary, of Judge Macy, for a copy of his opinion in the case above cited, to which he replied as follows:

HARLAN, IOWA, February 4, 1895.

Dr. J. F. Kennedy, Des Moines, Iowa:

MY DEAR SIR—Your letter at hand. I can only hurriedly answer. The opinion I rendered was oral, and I have not before me even the notes and citations I used. I have no doubt about the points involved. The legislature provided for the State Board of Health, and committed to it general powers with regard to health protection. That legislation does not contravene the principle of constitutional law that the right of authority of the legislature to pass or enact laws does not give that body authority to delegate the power to another body or branch of the government. The protection of health and morals of the citizens comes within police regulation, and the State Board can enact rules and regulations upon the matter of preserving the public health, and if they are not oppressive, whimsical, discriminating, but reasonable and just, and apply to all, will be sustained.

N. W. MACY.

When the State Board, in November, 1899, ordered general vaccination, and re-vaccination, when deemed necessary, Attorney-

General Milton Remley furnished the secretary the following, as his views from a legal standpoint of the right of the State Board to make such an order, and of the duty of local boards to enforce it:

It is claimed that compulsory vaccination is an invasion of the person of the individual. People submit to laws imposing burdens in the form of taxation and restraints upon their conduct or action with comparative equanimity, but when the enforcement of a law touches their person they are disposed to consider it a personal indignity. In such cases resentment and indignation often arise to the exclusion of reason and judgment. The power of the State to require all persons to be vaccinated, when the necessity therefor arises, is the same power as that exercised when whole blocks of buildings are torn down or blown up to stop the spread of a conflagration. It is the same kind of power as that which arrears and confines an insane person, or one who, for any cause, is a menace to others. It is called the police power of the State. "Public safety is the supreme law," is a maxim left us by the Romans. In times of danger to the public all things must yield to the demands of public welfare. No one having the smallpox would be permitted to parade the populous streets, spreading contagion everywhere. If under no statute law he could be restrained, he would be restrained by force: his life even would be taken, if necessary, under the law of self-protection or public safety, which is instinctively recognized by every human being.

The power to restrain one already infected with the disease, and the power to compel one to do an act which will prevent him from becoming infected, are one and the same—only differing in degrees.

The power of a state to require all persons to be vaccinated, when danger threatens, has not been directly determined by any court, to my knowledge, except in the case of *Morris v. City of Columbia*, by the supreme court of Georgia, which was decided a little more than a year ago. The constitutionality of the law was upheld by the court in a very able opinion, in which the principles of the law are clearly stated, and the authorities are cited and reviewed. Other courts have upheld laws involving the same principle and powers, but space will not permit me to review them. It will pay anyone interested in the subject to read the *Morris* case. It is reported in 30 S. E. R., 850.

The State of Iowa has not authorized city councils to determine when the necessity arises for vaccination of the public generally, or the people of a city, as has the state of Georgia. Nor has it empowered school boards to require the vaccination of the pupils as have Pennsylvania and some other states. The duty of determining what is necessary to be done to preserve, to protect public health, and when it is to be done, has been intrusted by the legislature to the boards of health, state and local. From the necessities of the case such matters must be left to the local authorities to a large extent. It is competent for the legislature to clothe boards of health or town councils, or whatever agents may be selected, or by what name they may be called, with power to take whatever steps the emergency or conditions demand to protect the public health. The legislature of this state has given this power to the boards of health, and I am thoroughly convinced that every reasonable order made by the boards of health will be upheld by the courts, even to the extent of requiring all persons not immune, in a community threatened with the dread scourge, to be vaccinated. The reasonableness of any order, depends, of course, upon the necessity for it, the proximity of the danger. Many considerations enter into the problem of what is reasonable. Care should, in all cases, be taken not to exceed the bounds of reasonableness. But when the necessity arises the matter should be taken hold of kindly, but with a firm hand and a heroic manner, remembering that "*salus populi suprema est lex.*"

CIRCULAR No. 4. 1900

REVISED

ORDINANCE FOR THE PROTECTION OF PUBLIC HEALTH, AND RECOMMENDED BY THE STATE BOARD OF HEALTH FOR ADOPTION BY THE CITIES AND TOWNS OF THE STATE OF IOWA

SECTION 1. Be it ordained by the council of the.....of.....that it shall be the duty of every physician residing, or practicing, within the limits of thisto give written notice to the mayor immediately, of any case of Asiatic cholera, smallpox, diphtheria, (membranous croup,) scarlet fever (scarlet rash, scarlatina), typhoid fever, measles or whooping cough that he may be called to attend professionally, and any physician who shall neglect, or refuse, to give such notice as herein required, within twenty-four hours after he shall first visit and ascertain the character of any such disease herein named, shall be fined not less than ten dollars nor more than twenty-five dollars for each and every day he so neglects to give such notice. In all cases where no physician is in attendance, it shall be the duty of any person having charge of, or being at the head of a family, or having the care or custody of any lodging rooms, to give notice in like manner as required herein of physicians, and anyone refusing or neglecting so to do shall be subject to like penalty.

SEC. 2. It shall be the duty of the mayor, upon receiving written notice of the existence of a case of Asiatic cholera, smallpox, diphtheria, (membranous croup,) scarlet fever (scarlet rash or scarlatina), to forthwith quarantine the premises; by serving written notice of such quarantine on the occupants thereof, and placing a danger card thereon; and take such measures as may be necessary and proper for the restriction and suppression of such disease; and to investigate all the circumstances attendant upon the occurrence of the same. He shall also make proper provision for care of the sick. Where the disease is measles or whooping cough, the premises shall not be quarantined, but they shall be placarded with the danger card, unless otherwise ordered by the local board of health.

And it shall be the further duty of the mayor to disinfect, or cause to be disinfected, the premises whereon such quarantined diseases have occurred, together with all infected furniture, bedding, clothing and other articles, as provided by regulations of the State Board of Health.

SEC. 3. For the purpose of this ordinance quarantine shall be deemed to be:

(1.) The placing upon such conspicuous place on each building, hall, lodging room or place wherein exists a contagious disease, as will best protect the public health, of a cloth or card not less than eighteen inches square, having imprinted thereon in large letters the word "Quarantine," the name of the disease, and the words, "No person shall be permitted to enter or

leave these premises except as provided by law, while it is quarantined, under the penalty provided by law."

(2.) The separation of the sick from all other persons, if possible, and from all persons except those in actual attendance.

(3.) The complete exclusion of all persons from the premises.

(4.) That no person shall leave said premises except the attending physician without a permit therefor signed by the mayor.

(5.) That no article that has been used on or about a person sick with a contagious or infectious disease shall be removed from the sick-room, nor from the premises, until the same has been properly disinfected.

SEC. 4. Nurses who have been employed to care for persons sick with a contagious or infectious disease may be released from quarantine when their services are no longer required, upon the order of the mayor. Before leaving the premises there must be thorough disinfection of their person and clothing.

SEC. 5. Isolation means the complete exclusion of all other persons from the sick except the nurse and attending physician; that the nurse shall be restrained from going to and from the premises, or mingling with the family; that all well persons shall be prevented from contact with bedding, clothing, food or other articles that have been used on or about the sick. Where from necessity the parents or family are nurses, the isolation and quarantine apply to them.

SEC. 6. Quarantine shall be established and maintained in each and every case for the period named herein, to-wit:

Scarlet fever—(Scarlatina, scarlet rash), thirty-five days.

Diphtheria—(Membranous croup), thirty-five days.

Smallpox—Forty days.

Asiatic cholera—Twenty-one days.

SEC. 7. When a family is quarantined for diphtheria, the head of the family, or bread winner, may, at the discretion of the local board, have the privilege of attending to his regular business, and of going to and from his house only when complying with the following conditions, and the mayor shall issue a permit therefor.

First—He shall change his clothing before going to and leaving his home to go to his place of business.

Second—He shall wash his hands, face, head and beard with a two per cent solution of carbolic acid each time before leaving his home to go to his place of business.

Third—While in the house he shall not act as nurse or live in the same room with the sick person.

Fourth—He shall not attend any public meeting, or attend any place where persons are congregated.

Fifth—This privilege shall not be granted to school teachers, nor to any person whose business brings him in intimate contact with children.

SEC. 8. Whenever there is complete recovery or death of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period prescribed herein has not elapsed. *Provided*, that no release of quarantine shall be permitted until at least seventeen days after the recovery of the last case, and proper disinfection of person and premises is made as hereinafter provided.

SEC. 9. After death or recovery of persons sick from contagious or infectious disease, the room, furniture, and other contents not to be destroyed, shall be thoroughly disinfected in accordance with regulations made by the State Board of Health.

If the disease was scarlet fever (scarlatina, scarlet rash) or smallpox the paper on the walls and ceiling, if any there be, shall be removed and completely burned. If the disease was diphtheria, typhoid fever or measles the paper on the wall shall be thoroughly dusted and brushed.

SEC. 10. No order for the release of quarantine shall be made by the mayor, except upon a report from the attending physician stating the number of persons on the quarantined premises sick with the infectious disease in question, their name, age and when the disease first appeared in each case, when recovered, and the means, if any, used for disinfection. IF THE MAYOR SHALL FIND THAT THE REGULATIONS OF THE STATE BOARD OF HEALTH RESPECTING QUARANTINE AND DISINFECTION HAVE BEEN COMPLIED WITH THE QUARANTINE SHALL BE FORTHWITH RELEASED. If the quarantine regulations have been complied with, and proper disinfection has not been done the mayor shall order it done under the supervision of the health officer or some other competent person and the quarantine shall be continued until it is done.

SEC. 11. No person shall give, lend or sell, or offer for sale any clothing or other articles liable to convey infection of any contagious disease unless the same have been disinfected and such disinfection approved by the mayor.

SEC. 12. If any person shall wilfully or maliciously remove or deface, or cause to be removed or defaced, any signal of danger, or cloth or card placed upon any quarantined premises, without proper authority as provided herein, he shall be fined not less than twenty-five, nor more than one hundred dollars, or imprisoned not less than five, nor more than thirty days, at the discretion of the court.

SEC. 13. If any person has attended school when affected with diphtheria, (membranous croup), scarlet fever (scarlatina, scarlet rash), smallpox or measles, the room in which such person attended shall be immediately closed until properly disinfected.

SEC. 14. It is the duty of every school teacher and school officer who discovers, or who has knowledge of a case of these contagious diseases, to cause the fact to be immediately reported to the mayor.

SEC. 15. During the existence of any contagious or infectious disease in any family or household, or place, in this.....and until after the recovery of the sick and the disinfection of the premises where such disease shall have existed, no person residing in such household, family or place, shall be permitted to attend any public meeting without written permission from the mayor, and no superintendent, teacher or officer of any school shall permit any child or person from any such family, household or place, to attend any school without a permit from the mayor, upon the recommendation of the attending physician showing thorough disinfection of the person, clothing and premises. And any person who shall knowingly violate any of the provisions of this section shall be fined not less than twenty-five nor more than one hundred dollars or be imprisoned not less than five, nor more than thirty days.

SEC. 16. When Asiatic cholera, smallpox, diphtheria, (membranous

croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, leprosy, measles, or any other contagious disease exists in any house or dwelling-place of a dealer in, or seller of milk, he shall discontinue, and cease to give, or sell, or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor. And no person who attends cows, and does the milking, or who has care of milk vessels, or the sale or distribution of milk, shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have any communication, direct, or indirect, with any person who resides in, or is an occupant of such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place. And any person, either as principal, agent or employe, who shall violate any of the provisions of this section, shall be fined not less than twenty-five dollars, nor more than fifty dollars, or be imprisoned not less than five days, nor more than ten days, at the discretion of the court.

SEC. 17. No person, company, corporation, or association having charge of, or control of, any schoolhouse or church, or of any building, room, or place used for school or church purposes, or for any public assembly in this shall permit the body of any person dead from any of the contagious or infectious diseases named in this ordinance, or any other dangerous contagious disease, to be taken into such schoolhouse, church, building, room, or place, for the purpose of holding funeral services over such body; and no sexton, undertaker, or other person having charge of, or direction of, the burial of any body dead from any of the said diseases, shall permit the coffin or casket containing such body to be opened in the presence of any child, nor shall any child be permitted to act as pall-bearer or carrier at such funeral. Any person who shall violate, or cause to be violated, any of the provisions of this section shall be liable to a fine of not less than twenty-five dollars, or to imprisonment not less than five days, at the direction of the court.

SEC. 18. If any person, whether as owner, occupant, lessee, or agent, shall rent or lease, or permit the occupation by any person of any house, room, or place in which there have been any of the contagious diseases named in this ordinance, unless the same has been previously thoroughly disinfected, and such disinfection approved by the mayor, he shall be fined one hundred dollars, or be imprisoned thirty days, at the discretion of the court; and it shall be the duty of the mayor and sanitary police to maintain a danger signal upon any such premises, as provided in section three of this ordinance, until such disinfection be made.

SEC. 19. A body dead from smallpox must be immediately wrapped in a cloth saturated with the strongest disinfectant solution without previous washing, and buried deep, and no body dead from this disease shall, under any circumstances, or any lapse of time, be disinterred.

SEC. 20. The body of a person who has died from Asiatic cholera, yellow fever, leprosy, diphtheria (membranous croup), scarlet fever (scarlatina or scarlet rash) must not be removed from the sick room until it has been wrapped in a cloth saturated with a solution of corrosive sublimate (one ounce to six gallons of water), and then tightly inclosed in a coffin. The body shall then be buried immediately without the attendance of any person other than is necessary for the interment thereof.

SEC. 21. No public funeral shall be held of any person who has died from either of said diseases named in sections nineteen and twenty, and no public funeral shall be held in a house, nor on any premises where there is a case of, nor where a death has recently occurred from, either of said diseases.

SEC. 22. Any railroad car, street car, omnibus, cab, hack, or other vehicle, in which a person has been carried affected with any of the diseases named herein, shall be forthwith removed from service and be disinfected before being used again. And any person, either as owner, lessee, agent, or employe, who shall violate the provisions of this section in the use of such vehicle, shall be fined not less than fifty dollars, nor more than one hundred dollars, or be imprisoned not less than ten days, nor more than thirty days, at the discretion of the court.

SEC. 23. Rules and regulations made by the State Board of Health and by the local board of health of this....., concerning Asiatic cholera, smallpox, diphtheria (membranous croup), typhoid fever, scarlet fever (scarlatina, scarlet rash), or other contagious or infectious diseases, shall be enforced by the mayor under the supervision of the health officer; and it shall be the duty of all police, and other public officers of this....., in their proper capacity, to report to the mayor or health officer any violations of such rules and regulations, and to aid and assist the board of health the mayor, and health officer, in the enforcement of said rules and regulations.

SEC. 24. It shall be the duty of all police officers to observe the sanitary condition of their districts, and to report through their chief to the health officer promptly, any nuisance or accumulated filth found in any portion of the corporation.

SEC. 25. The mayor shall have authority to appoint sanitary police whose duty it shall be to aid in the establishment and enforcement of quarantine regulations, and such other sanitary regulations as may be provided by the local board and the State Board of Health, and at such time, and in such manner as the mayor or the health officer may direct. Said sanitary police shall visit each quarantined premises at least once each forty-eight hours, and at such other times as the mayor or health officer may direct. He shall see that strict quarantine is maintained, and the premises properly placarded. *Provided*, he shall not enter any dwelling or place unless so requested by the occupants thereof, nor shall he disturb the inmates or the sick unless he has good and sufficient reason to believe there is wilful violation of the quarantine regulations therein. He shall have full powers of a police officer to make arrests for violations of quarantine or health regulations, and shall file information against such offenders before the police court. He shall appear for duty at the office of the mayor on or before ten o'clock A. M. each day. His compensation shall be the same as that allowed other police officers.

BURIALS

SEC. 26. Upon the death of any person within the limits of this..... it shall be the duty of the physician who was attending at the time of death, or of the coroner, when the case comes under his official jurisdiction, to furnish within twenty-four hours after such death, to the undertaker, or other person superintending the burial of said decedent, a certificate setting forth the full name, age, sex, color, place of death, date and cause of death,

and such other facts as may be required by regulations of the State Board of Health and the statutes of the state of Iowa. If any person shall die without the attendance of a physician, or if the physician who did attend the decedent at the time of death shall neglect or refuse to give such certificate as aforesaid, it shall be the duty of the undertaker, or of any person acquainted with the facts, to report the same to the health officer of the local board of health, who is hereby authorized to give a certificate of death as aforesaid; *provided*, it be not a case requiring the attendance of a coroner.

SEC. 27. No sexton, or other person or persons, having charge or control of any cemetery, burying place, or tomb, or vault within the limits of this or under the control of this ; and no undertaker, or other person or persons, shall inter, entomb, or place in any vault within the limits of this the dead body of any person, or remove such body from or out of the without having procured a certificate of death as herein provided; and it shall be the duty of any undertaker, or other person or persons having charge of the burial or removal of the dead body of any person to deliver said certificate of death forthwith to the clerk of the local board of health.

SEC. 28. It shall be the duty of the clerk of the local board of health upon the presentation of a certificate of death in accordance with the provisions of this ordinance, and not otherwise, to issue a permit to inter, entomb, or place in a vault the body of the deceased person named in such certificate, and said clerk shall be entitled to charge and receive for issuing such permit a fee of cents. *Provided*, a body dead from diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), smallpox, Asiatic cholera, leprosy or typhus fever shall not be deposited in a receiving vault.

SEC. 29. Upon the presentation of the proper application in accordance with the regulations made by the State Board of Health for the removal of the dead body of a human being out of the limits of this , it shall be the duty of the clerk of the local board of health to issue a permit countersigned by the mayor for such removal. *Provided*, that where said body is to be disinterred such application must be accompanied with a disinterment permit from the State Board of Health, but no permit for such removal shall be granted in any case of a body dead from Asiatic cholera, smallpox, leprosy, typhus fever, or yellow fever, or from any sequela or complications of said diseases; nor shall any permit for such removal be granted in any case whatsoever where the cause of death was a contagious or infectious disease, or any sequela of such disease, unless the permit be approved and signed by the health officer of the local board of health, nor shall a permit be granted except upon the presentation of the proper certificate of the cause of death.

SEC. 30. The clerk of the local board of health shall enter in a suitable book to be kept for that purpose, a record of all burial permits issued, specifying the date of issue, to whom issued, together with all the items of information contained in the certificate upon which the permit was issued. And on or before the tenth day of each month he shall report to the State Board of Health the deaths and causes thereof for the preceding calendar month.

SEC. 31. No hack, omnibus, street car, or other closed vehicle used for

the conveyance of the living shall be permitted to carry the body of any person dead from an infectious or contagious disease; nor with the knowledge of the owner, driver, or person in charge thereof, to carry any person or article liable to communicate the infection or contagion of such disease.

SEC. 32. Each undertaker or sexton, and every person engaged or concerned in the burial of the body of a human being in violation of the provisions of sections twenty-six, twenty-seven and thirty-one of this ordinance, and the owners, officers and employes of any transportation company, or any other person engaged or concerned in the removal of such dead body from the limits of this in violation of any of the provisions of this ordinance, shall be fined not less than fifty dollars, nor more than one hundred dollars, or be imprisoned not less than ten days, nor more than thirty days, in the discretion of the court, for each offense.

SEC. 33. If any person shall neglect or refuse to furnish the certificate of death as required by section twenty-six of this ordinance, he shall be fined not less than five dollars for each offense. *Provided*, that this section shall not apply to coroners engaged in official investigation of a cause of death.

SEC. 34. If any physician, or any other person within the limits of this shall knowingly attempt to secrete, or withhold the true character of any of the contagious or infectious diseases specified in this ordinance, or shall in any manner whatsoever attempt to deceive or defraud, or who shall make any false statement in making a certificate of cause of death as required by this ordinance, by giving any other than the true cause of such death; or, if the decedent was affected with any of such contagious or infectious diseases during his last sickness, he shall neglect or refuse to state such fact in such certificate, he shall be fined not less than twenty-five dollars, nor more than one hundred dollars, or be imprisoned not less than five days, nor more than thirty days, at the discretion of the court.

SLAUGHTER HOUSES

SEC. 35. No slaughter house shall be erected nor used within the limits of this unless a permit from the mayor has been first obtained, with the advice and assent of the health officer, and no slaughter house shall be erected, nor used within three hundred and twenty feet of any public highway, nor within six hundred feet of any dwelling house, schoolhouse or church, or any building used for church purposes. It shall be erected on dry, hard land that can be well drained. It shall be amply supplied with clean, wholesome water from springs, wells, or unpolluted streams. It shall be floored with a tight, solid floor of hard wood, or cement, or well-joined stone. The yards, sheds, and close pens shall be dry, and free from mud and filth, and their sides or walls shall be thoroughly whitewashed at least twice each year. All its apparatus shall be kept in a neat and orderly manner, and free from offensive smells. When the slaughtering for the day is completed, the sides and floor of the slaughter room shall be thoroughly washed with an abundance of clean water. No animal matter of any kind shall be permitted to remain in, under, or near the slaughter house to decompose or putrefy. When blood and offal, or immature animals are fed to swine on the premises, such arrangement shall be made that such material shall be speedily consumed. The blood of all slaughtered animals shall be conducted by a water-tight gutter to a water-tight trough in the hog-yard. The offal and

bodies of immature animals shall be thrown into a pen with a tight, dry floor, to be consumed at once by the swine; and all portions not consumed within twelve hours shall be removed from the pen, and be burned, buried or composted with fresh earth. When the blood or offal are not fed to swine on the premises, they shall be carried away each day in close tanks, or be converted into fertilizers, or otherwise utilized by some apparatus the gases from which shall be carried under the furnace and consumed. The fat, and all material from which fat or oil is to be extracted, shall be rendered within such a time after the slaughtering of the animals that no offensive odors shall arise from them, or from the process of rendering. Any person who shall violate any of the provisions of this section shall be fined not less than twenty-five dollars, nor more than one hundred dollars, or be imprisoned not less than five days, nor more than thirty days. And upon conviction thereof, all grants, licenses, or privileges contemplated herein shall be immediately revoked and annulled.

The provisions of this section, so far as practicable, shall apply to so-called "knacker's" plants, or plants for the disposal of the bodies of dead animals, and to premises used for the killing and shipment of poultry.

DISEASED ANIMALS

SEC. 36. Every person owning, or having the care or custody of any animal which he shall know, or have reason to suspect, is affected with glanders, farcy, anthrax, or any other contagious or infectious disease dangerous to the public health, shall immediately isolate such animal from all other animals, and shall give notice thereof and of the location of such animal to the mayor. And no person having the care or custody of, or owning any animal affected with, or which there is good reason to believe is affected with such disease, shall lead, drive, or permit such animal to go on or over any public grounds, uninclosed land, or on any street, public highway, lane or alley; nor permit it to drink at any public water trough, pail or spring; nor to keep such diseased animal in any inclosure in or from which such diseased animal may come in contact with, or close proximity to, any animal not affected with such disease. And an animal will be deemed as "suspected" when it has stood in the stable with or been in contact with, an animal known to have any of said communicable diseases; or if placed in a stable, yard or other inclosure where such diseased animal has recently been kept. Whenever an animal affected with any of the diseases herein named shall die, or shall be killed, the body of such animal shall be immediately burned, or buried not less than four feet deep, without removing the hide from the carcass. All bedding, litter, excrement, etc., that have accumulated about such animal, together with all blood, or other fluid elements that have escaped from it shall be burned. Dirt floors of stables wherein such animal has been kept shall be removed to the depth of four inches and burned. Everything about the stable, combs, brushes, or any post or fence where it has stood, and every part of harness or wagon used with such animal, and the stable where it has been kept, shall be thoroughly disinfected under the direction of a duly qualified veterinary surgeon. Whenever the owner, or person having in charge any animal declared by the state veterinary surgeon or other authorized person to have the glanders, shall neglect or refuse to destroy said animal, the premises whereon said

animal is kept shall be quarantined until such animal is destroyed, and the premises thoroughly disinfected. And any person who shall neglect, or refuse, to obey any of the provisions of this section shall be fined not less than twenty-five dollars, nor more than fifty dollars, for each diseased animal, and for each day of such refusal, and for all damages that may result therefrom.

SEC. 37. The "quarantine" shall be construed to mean the perfect isolation of all diseased or suspected animals from contact with healthy animals; as well as the exclusion of such healthy animals from the yards, stables, enclosures or grounds wherever said suspected or diseased animals are, or have been kept.

SEC. 38. The flesh of pregnant animals must not be sold nor used for human food after the seventh month of pregnancy for cows, and the tenth week for sows.

NUISANCES

SEC. 39. (1.) No privy, vault, cesspool, nor reservoir into which a privy water closet, stable or sink is drained, except it be water tight, shall be established nor permitted within one hundred feet of any well, spring or other source of water used for drinking or culinary purposes.

(2.) All privy vaults, reservoirs or cesspools named in rule 1 must be cleaned out at least once each year; and from the first day of May to the first day of November of each year shall be thoroughly disinfected by adding to the contents thereof twice each month two pounds of copperas, dissolved in a pail of water, or the contents be thickly covered with fresh lime.

(3.) No privy vault nor cesspool shall open into any stream or ditch, nor into any drain except common sewers.

(4.) All sewer drains that pass within one hundred feet of any source of water used for drinking or culinary purposes shall be water-tight.

(5.) No sewer drain shall empty into any lake or pond, nor into any cesspool or abandoned well.

(6.) No offal or waste from any creamery shall be thrown upon or into any stream, ravine, open ditch or drain.

(7.) No house offal or dead animal shall be left upon any lot or land within thisunless the same be buried. The carcass of all animals dead from an infectious or contagious disease shall be immediately burned. All cellars and outbuildings must be cleaned before the first day of May in each year.

(8.) Between the first day of May and the first day of November no hogs shall be kept within the limits of this.....except in pens with dry floors, or pens free from all filth and standing water. Cattle yards, barns and stables must be kept free from all filth and offensive odor.

Any person violating any of the provisions of this section shall be fined not less than five, nor more than fifty dollars, or be imprisoned not less than two nor more than fifteen days, and the court shall order the abatement of the nuisance at the cost of the defendant in substantially the manner provided in sections five thousand and eighty-one to five thousand and eighty-five, inclusive, of the Code of Iowa.

GENERAL PROVISIONS

SEC. 40. It shall be the duty of every police officer who has any knowledge of, or has good reason to believe, that any of the provisions of this

ordinance is being violated, to make report of same through his chief to the health officer of the local board of health.

SEC. 41. Any citizen who has reason to believe that any of the provisions of this ordinance is being violated may file an information under oath, describing the person and the offense charged, and it shall be the duty of the attorney of the.....forthwith to prosecute the same before the proper court.

SEC. 42. If any person by himself, or by his agent or employe, shall wilfully violate any of the provisions of this ordinance, where no other penalty is provided, he shall be fined not less than ten dollars, nor more than one hundred dollars, or be imprisoned not less than three days, nor more than thirty days, in the discretion of the court.

SEC. 43. This ordinance shall take effect and be in force on and after its publication.

NOTES

Local boards of health shall make such regulations as are necessary for the protection of the public health respecting *nuisances, sources of filth, causes of sickness, rabid animals and quarantine* NOT IN CONFLICT WITH ANY REGULATIONS OF THE STATE BOARD OF HEALTH. Sec. 2568.

While the statute gives the board discretionary exercise of judgment as to what they may deem necessary for the public health, the intent and purpose of the whole statute is the protection of the public health, and it is mandatory.

NUISANCES

(1.) Code, section 5078: "The erecting, continuing or using any building or other place for the exercise of any trade, employment or manufacture, which, by occasioning noxious exhalations, offensive smells, or other annoyances, becomes injurious and dangerous to the health, comfort or property of individuals, or the public *the causing or suffering any offal, filth or noisome substance to be collected or to remain in any place to the prejudice of others*, the obstructing or impeding without legal authority the passage of any navigable river, harbor or collection of water or the corrupting or rendering unwholesome or impure the water of any river, stream or pond, * * * are nuisances."

"Where an indictment charged that the defendant 'unlawfully and injuriously did erect, continue and use a certain enclosure or pen, in which cattle and hogs were confined, fed and watered, and the excrement, decayed food; slops and other filth were retained,' whereby were occasioned 'noxious exhalations and offensive smells, greatly corrupting and infesting the air; and other annoyances dangerous to the public health, comfort and property of the good people residing in that immediate neighborhood,' it was held that the acts charged constituted a public, indictable nuisance, both under this section (four thousand and eighty-nine) of the statute; and at the common law." *The State v. Kaster*, 35 Iowa Supreme Court Reports, 221.

Any use of property, or any trade, that corrupts the atmosphere with smoke, noxious vapors, noisome smells, dust, or other substances or gases producing injury to property or to health. or impairing the comfortable

enjoyment of property, is a nuisance. Wood on Nuisances, page 574, section 531.

Where defendant erected stock yards so near plaintiff's dwelling, and so kept them, that the odors therefrom were not only an annoyance; but were unwholesome, threatening the health of plaintiff and his family, *held* that the defendant could not escape liability on the ground that the yards were necessary to the operations of the road, and that the odors could not be avoided.

Shively v. Cedar Rapids, I.F. & N.W.R.R. Co., 74 Iowa, 170.
Meeker v. Rensselaer, 14 Wend., 397.

In the case of *City of Salem v. Eastern Railroad Company*, the supreme court of Massachusetts, (98, page 443), under a statute which is a verbatim copy of the Iowa statute, held that the adjudication of the board that a nuisance exists is conclusive, and no appeal lies therefrom. The board should keep an accurate record of their proceedings, and all adjudications should appear therein in clear and distinct language. It is not the purpose of the order to direct in what mode the person should proceed to remove the nuisance. It should direct the end to be accomplished, leaving the party to adopt any effectual mode he may choose. If the owner or occupant neglects to remove the nuisance, the board are at liberty to enter upon private property, where it exists, and take such measures as they may see fit for its removal.

The court further says, in relation to boards of health: "Their action is intended to be prompt and summary. They are clothed with extraordinary powers for the protection of the community from noxious influences affecting life and health; and it is important that their proceedings should be embarrassed and delayed as little as possible by the necessary observances of formalities. Although notice and opportunity to be heard upon matters affecting private interests ought always to be given when practicable, yet the nature and object of those proceedings are such that it is deemed to be most for the general good that notice should not be essential to the right of the board to act for the public safety. Delay for the purpose of giving notice, involving either of public notice or of inquiry to ascertain who are the parties whose interests will be affected, and further delay for such hearings as the parties may think necessary for the protection of their interests, might defeat all beneficial results from an attempt to exercise the powers conferred upon boards of health. The necessity of the case, and the importance of the public interests at stake, justify the omission of notice to the individual.

"Notice must be given of general regulations prescribed by the board before parties can be held in default for a disregard of their requirements. No previous notice to parties so to be affected by them is necessary. They belong to that class of police regulations to which all individual rights of property are held subject, whether established directly by enactments of the legislature, or by its authority through boards of local administration."

Shuster v. Met. Board of Health, 49 Barb. (N.Y. S.C.), 450.
Wood on Nuisances, sections 494, 504, 525.

A slaughter house in a city or public place, or near a highway, or where numerous persons reside, is *prima facie* a nuisance.

Bushnell v. Robson & Co., 62 Iowa, 540.
Wood on Nuisances, section 837.

CITIES AND TOWNS SHALL HAVE POWER TO ABATE NUISANCES—CODE,
SECTION 696

The power to abate nuisances does not enable the council to determine conclusively that a particular thing constitutes a nuisance; and if it orders the removal of a thing which is, in fact, not a nuisance, the person causing its removal will be individually liable in damages.

Cole v Keglär, 64 Iowa, 59.

The power given in relation to nuisances is to abate them, and in the exercise of this power a city cannot provide for the punishment by fine of one who maintains a nuisance.

Nevada v. Hutchins, 59 Iowa, 506.

Under the authority of section 696 a city cannot by ordinance provide for the imposition of fines against persons committing a nuisance. The power of the city is limited to the abatement of such nuisances.

Knoxville v. C., B. & Q. Ry. Co., 83 Iowa, 636.

The power to suppress does not imply the power to punish, and must be exercised in such way that suppression shall be the direct, and not merely the incidental, result of the exercise of power.

Chariton v. Barber, 54 Iowa, 360.

A municipal corporation is not authorized to bring an action in equity to enjoin and abate a nuisance on the ground that it is injurious to its citizens, and the authority given by section six hundred and ninety-six must be exercised through the medium of an ordinance, and not by equitable proceedings in court.

Ottumwa v. Chinn, 75 Iowa, 405.

A regulation adopted by a local board of health, and enforced by ordinance, prohibiting hogpens, except for the purpose of commerce, in cities of fifteen thousand inhabitants, is not unreasonable, even though it thereunder becomes a misdemeanor to keep in such city a clean and inoffensive pen with but one hog therein.

Cedar Rapids v. Holcomb, 68 Iowa, 107.

QUARANTINE

The city is not responsible to individuals for the neglect or nonfeasance of its agents or officers in executing the powers there conferred.

Ogg v. Lansing, 35 Iowa, 495.

The board of health may, under section two thousand five hundred and seventy, erect a temporary building to which infected persons may be

removed for isolation, and the county will be liable for the expenses thereof in case of the inability of the infected person or persons to pay such charge.

Staples v. Plymouth County, 62 Iowa, 364.

Clinton v. Clinton County, 61 Iowa, 205.

Gill v. Appanoose County, 68 Iowa, 20.

The board will not be bound by the actions of individual members in authorizing a physician to render services. Such action must be by the board as a body.

Young v. Black Hawk County, 66 Iowa, 460.

SLAUGHTER HOUSES, REGULATION OF

Code section six hundred and ninety-six. See cases cited under "nuisances."

DISEASED ANIMALS

Punishment for knowingly bringing within the state, or harboring therein. Code, section five thousand and twelve to five thousand and nineteen inclusive.

Diseased animals may be killed. Code, sections two thousand three hundred and thirty-nine, two thousand five hundred and thirty-four.

BURIAL OF THE DEAD

Cities and towns have power to regulate the burial of the dead. Code, section six hundred and ninety-seven.

Local boards of health shall regulate cemeteries and burial of the dead. Code, section two thousand five hundred and sixty-eight.

CIRCULAR No. 5, 1900.

INFORMATION WITH RECOMMENDATIONS RESPECT- ING TUBERCULOSIS

PREFATORY

The Iowa State Board of Health, as created by law, is the guardian of the public health within the state. This circular is issued to inform the people that tuberculosis, an infectious disease which exists throughout the state, is causing more human suffering and greater loss of life among our people than any other existing disease, and to advise them how to prevent its spread.

Tuberculosis, properly, should be subject to quarantine restrictions; and its control should be a part of the duties of state and local boards of health in order that such boards may fulfill their mission in the sanitary world.

With this conviction this circular is placed before the people of the State with the hope that it may be given the widest possible circulation.

Tuberculosis, more commonly called consumption, has existed from a very early period in the world's history. Owing to its prevalence, its insidious approach, its easy communicability and its great fatality, it becomes necessary that the people of Iowa should enlighten themselves as to the nature of the disease and its prevention.

Tuberculosis is an infectious disease, due to the presence and action of a germ—the *bacillus tuberculosis*. The disease is characterized by the presence of nodules called tubercles, which may undergo certain changes, become cheesy, hard and calcified, or ulcerating and breaking down form abscesses.

It is estimated that nine persons, on an average, die daily of tuberculosis in Iowa!

Tuberculosis affects man and animals alike. Hence, the disease may be transmitted from man to man, animal to animal, man to animal, and *vice versa*. It is transmitted by inhalation, injection and inoculation. A tuberculous patient may, by expectorating, coughing, sneezing, or through the excretions of the body, infect the house in which he or she lives, so that the air is constantly impregnated with the tubercle bacillus, and persons associating or living with such patient or in such infected premises, are constantly in danger of contracting the disease.

Recognizing these facts, the State Board of Health of Iowa has placed tuberculosis on the list of infectious diseases, and recommends that local boards of health deal with deceased persons and infected premises accordingly.

The greatest source of infection to man is the tuberculous human patient, and the next greatest is the tuberculous bovine.

The milk of a tuberculous cow is a great menace to the health and life of its consumer. Sterilization of such milk will prevent the spread of tuberculosis by destroying the germs, but it will not make such milk a good food for those who consume it. The flesh of a tuberculous animal, when eaten rare, is dangerous; but, if well cooked, cannot transmit the disease. The flesh and milk of tuberculous animals contain tuberculin as manufactured by the tubercle bacillus, which is an intestinal irritant, and consequently such meat and milk must be classed as inferior food, and dangerous to a delicate consumer.

Tuberculosis in our bovine herds causes unthriftiness, the loss of many valuable animals, and is a constant menace to human life. Instances are recorded where tuberculosis in a bovine has been rapidly spread through a herd of hogs, thereby causing financial loss. The government inspectors at the abattoirs are daily consigning the carcasses of hogs to the fertilizing tanks because of this disease. From a financial standpoint it would pay our cattle owners to test their herds and get rid of the disease, and thereby prevent such losses.

PREVENTION

Prevention is infinitely better than cure. Tuberculosis is preventable, just as other germ diseases are. By testing our dairy herds we remove a fruitful source of infection to man and domestic animals.

By restricting tuberculous persons in their habits we remove the greatest source of infection to mankind. Such restrictions should be as follows:

No tuberculous person should be permitted to sell meat or milk.

No tuberculous person should be permitted to spit in any premises or upon the public highways.

No tuberculous person should be permitted to drink from a public drinking cup.

No tuberculous person should be permitted to teach in public or private schools.

No tuberculous person should be permitted to nurse the sick.

No tuberculous person should be permitted to sleep in the same room with other persons or children.

No tuberculous mother should be permitted to nurse her child.

DIRECTIONS FOR THE CARE OF TUBERCULOUS PATIENTS

1. Try to have the patient hopeful and anxious for recovery. Let all attendants be cheerful, encouraging the patient at all times. A cheerful, hopeful patient has much better chances for recovery than a despondent patient.

2. Have the patient live in the open air as much as possible, avoiding damp or dusty atmosphere, and taking what exercise he or she can endure without causing exhaustion. Plenty of sunlight is good for the patient, protecting the head from the hot sun while giving the body a sun bath. Teach the patient to inspire a deep, full breath through the nostrils, retaining the same for as long a time as is convenient before expiring, which should be through the nostrils.

3. Have the patient warmly clad in woolen garments, so as to prevent chilling or taking cold.

4. Give the patient all he or she can eat, of good, nutritious food, changing the diet as a stimulus to the appetite.

5. Have the patient take plenty of rest. In summer, a hammock, so placed as to shade the head and expose the body to the direct rays of the sun, is good.

SUMMARY

Plenty of fresh air and sunshine.

A reasonable amount of exercise in open air.

Plenty of good, nutritious food.

An abundance of rest.

DISINFECTION

Premises in which tuberculous persons live should be disinfected at least once a week, and the sputum and excretions of such persons should be consigned to receptacles containing a sufficient quantity of effective disinfectant solution to submerge the same. All public houses, including hotels, halls, opera houses, railway coaches, depot waiting-rooms, churches, and school buildings, should be disinfected and thoroughly ventilated. Sunlight is one of the best general disinfectants, and should be admitted to all homes and buildings.

DIRECTIONS FOR DISINFECTING PREMISES

1. Remove all movable furniture, bedding, carpets, rugs, etc., once a week, placing same in the open air and sunlight.

2. Disinfect the room with formaldehyde gas, after plugging all openings.

3. Thoroughly ventilate the room before replacing the furniture, bedding, etc.

4. Use as a disinfectant solution in cuspidors, slop jars, etc., carbolic acid and water, five (5) parts of acid to ninety-five (95) parts of water; or, bichloride of mercury and water, one to 500.

DIRECTIONS FOR DISINFECTING DAIRY BARNs, AND FOR THE CARE OF MILK

1. Clean out all litter, excrement, rejected fodder, cobwebs and dust, thoroughly sweeping down the walls and ceilings.

2. Spray ceiling, walls and floor with a solution of bichloride and water, one to five hundred.

3. Thoroughly whitewash all parts of the barn with a wash containing one-quarter of a pound of carbolic acid and a pound and one-half of lime to a gallon of water.

4. See that the drainage from under the floors is sufficient to carry away all refuse matter. This is an important factor in keeping a healthy, clean barn.

5. See that all manure is carted away daily. We find in some instances great piles of heating manure against the outside walls, and the offensive fumes therefrom permeating all parts of the barn.

6. See that the watering troughs are cleansed two or three times a week, and only pure water given the dairy cow.

After milking each cow the milk should be carried to a scrupulously clean milk room, and there strained and cooled. It should be stirred frequently until thoroughly cooled. A can of milk may be placed in a refrigerator and allowed to cool without stirring and it is certain to have a bad odor and taste, but with proper stirring while cooling this will be prevented.

THE DUTY OF LOCAL BOARDS

Local boards of health should require all such general preventive measures to be carried out under their jurisdiction. They should also require the testing of dairy herds from which milk is sold within their jurisdiction, as well as a sanitary condition of such dairy premises and utensils.

Shall we not, one and all, unitedly make sanitary war upon this insidious disease, which is the greatest menace to human life and happiness in our fair state, as well as throughout the entire civilized world?

The State Board of Health confidently appeals to the local health boards, to the progressive "press" of the state, and to the enlightened judgment of our people, for prompt and efficient co-operation in the restriction and, so far as possible, the prevention of this Great White Plague!

CIRCULAR No. 6, 1898.

INSPECTION OF ILLUMINATING OILS AND LINSEED OIL

RULES AND REGULATIONS

KEROSENE OIL

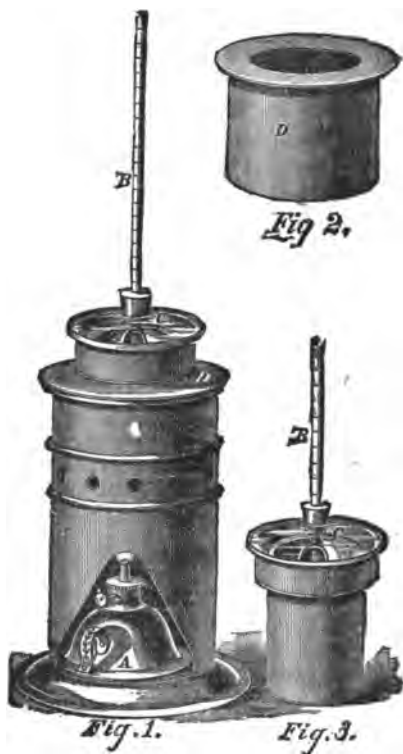
RULE 1. *The instruments*—The instrument to be used in testing oil under the provisions of chapter 11, title 12, the code, shall be that made by Eimer & Amend, New York, and shall have inscribed thereon the words: "Oil Tester, Iowa State Board of Health," and shall be constructed as shown in the following diagram:

Fig. 1 represents the instrument entire. It consists of a sheet copper stand $8\frac{1}{2}$ inches high exclusive of the base, and $4\frac{1}{2}$ inches in diameter. On one side is an aperture $3\frac{1}{2}$ inches high for introducing a small spirit lamp, A; or, better, a small gas burner, instead of a lamp, when gas is available.

The water bath, Fig. 2, is also of copper, $4\frac{1}{2}$ inches in height and 4 inches in diameter inside, provided with a flanged cover; the opening in the cover $2\frac{3}{8}$ inches in diameter. The flange, which supports the bath in the cylindrical stand, is one-fourth inch projection. The capacity of the bath is about 20 fluid ounces, which is indicated by a mark on the inside.

Fig. 3 represents the oil cup, which is also of copper. The section below the flange is $3\frac{3}{8}$ inches high and $2\frac{3}{4}$ inches in diameter. The section above the flange is 1 inch high and $3\frac{3}{8}$ inches in diameter, and serves as the vapor chamber. A small flange at the upper rim serves to hold the cover, which is of glass, in place.

To prevent reflection from the otherwise bright surface of the metal, the inside is blackened by forming a sulphide of ammonia. The capacity of



the oil-cup is about ten fluid ounces, when filled to within one-eighth of an inch of the flange which joins the oil-cup and the vapor chamber.

The cover of the oil-cup, C, is of glass, three and five-eighths inches in diameter; is perforated on one side with a circular opening, which is filled with a cork, through which passes the thermometer, B. On the rim is another oval opening three-fourths of an inch deep, and the same in width, through which is to be passed the flashing jet in testing. The glass cover is used instead of metal that the operator may more readily note the exact point at which the flash occurs. A small gas jet one-fourth of an inch in length is best for igniting the vapor. Where gas cannot be had, and to prevent the frequent discrepancy in tests made by different inspectors of the same oil at different places, owing largely, if not entirely, to the difference in their torches, and to obviate the frequent annoyance from that fact, and from smoke from waxed threads filling the vapor chamber of the cup, thereby preventing an accurate and reliable test, a portable gas torch has been devised, which inspectors in this State are required to procure and use for testing products of petroleum.

THE FLASH TEST

RULE 2. The test shall be made as follows:

Remove the oil-cup and fill the water-bath with cold water to the mark on the inside. Place the oil-cup in the water-bath, and fill it with oil to within one-eighth of an inch of the flange. Care must be taken that oil does not flow over the flange. Remove all air bubbles with a piece of blotting paper. Place the glass cover on the oil-cup and adjust the thermometer so that its bulb shall be entirely covered by the oil.

Apply the apparatus for heating the water-bath, and so adjust the flame that the degree of heating will *not exceed* two degrees per minute.

When the temperature of the oil has reached ninety degrees Fahrenheit, the test should commence by inserting the torch, which should have a very small flame, into the oval opening in the glass cover, passing it in at such an angle as to have the flame about three-eighths of an inch above the oil, and reaching near the center of the vapor chamber.

The motion must be steady and uniform, rapid, and without any pause. This must be repeated at every two degrees' rise in the thermometer until one hundred degrees is reached, when the torch must be applied at each degree of temperature until one hundred and five degrees is reached. Great care must be exercised to secure accuracy at this point, and to this end the torch must be applied just before the temperature reaches the one hundred and five degree point. If no flash is shown at this point continue the test at each two degrees' rise until the flashing point is reached, which is indicated by the appearance of a slight bluish flame **ON THE SURFACE OF THE OIL**. *The lowest point at which this vapor flame appears on the surface of the oil*, and a perceptible flash is produced, is to be designated as the flashing point. The temperature of the oil must be noted before the torch is applied. The flame of the torch must not touch the oil or come within three-eighths of an inch of its surface. Oil that flashes at one hundred and five degrees, or below that, must be rejected.

As cold oil will expand by heating, care must be taken that it does not rise so as to flow over or on the flange or shoulder of the oil cup. That part

of the oil cup comprising the vapor chamber and the flange must be dry and entirely free from oil. All air bubbles must be removed from the surface of the oil; this can be done with ordinary blotting paper. The water-bath cup must be filled with cold water for each separate test, and the oil in the cup brought to a temperature of sixty to sixty-five degrees before the lamp is placed under the water-bath. The oil cup must be carefully and thoroughly wiped dry of oil from the previous test. The flame of the torch must not exceed one-eighth of an inch in length or size.

FOR TESTING THREE HUNDRED DEGREES

RULE 3. The instrument to be used for testing oils which come under the provisions of section two thousand five hundred and eight of the Code, shall consist of the cylinder shown in Figure 1 of the diagram, the copper oil cup, shown in Figure 3, the copper collar, D, for suspending the oil cup in the cylinder, and an adjustable wire support for suspending the thermometer in the oil.

RULE 4. To ascertain the igniting and burning point the test should be made as follows:

Fill the cup with the oil to be tested to within three-eighths of an inch of the flange joining the cup and the vapor chamber above. Care must be taken that oil does not flow over the flange, by expansion from heating. Place the cup in the cylinder, covered with the collar D. Adjust the wire support so that the thermometer bulb, when supported thereon, will be just covered by the oil, the bulb also being near the center of the cup. Place the lamp or gas jet under the cup. Adjust the flame so that the degree of heating will not exceed ten degrees each minute until two hundred and fifty degrees Fahrenheit is reached, when the rate must not exceed five degrees a minute above that point. The torch to be used must be the same as described in rule one, for obtaining the flash-point. Apply the torch tightly across and not less than three-eighths of an inch above the surface of the oil at each five degrees rise in the temperature, until the oil ignites and burns. The lowest point at which the oil will ignite and burn is to be taken as the burning point, and no oil which burns at a temperature below three hundred and one degrees Fahrenheit must be approved for the purposes set forth in section two thousand five hundred and eight. When approved, the package, cask, barrel, or vessel, containing the oil from which the oil tested was taken, must be branded with stencil number three, as provided in said section and rule seven. The actual point at which the oil burns must be branded on the barrel. If it burns at three hundred and one degrees, or below that, it must be rejected. In this test the water-bath cup and the glass cover are not used. the flame of the lamp being applied directly to the bottom of the oil cup.

GENERAL RULES

RULE 5. All instruments, testers, and thermometers to be used by inspectors must be approved by, and registered in, the office of the State Board of Health.

RULE 6. Inspectors must have all previous brands of tests removed from packages, casks, or barrels before affixing their brand thereon.

RULE 7. Brand number one must be circular in form, not less than

eight inches in diameter, outside measurement, with ample margin to protect the vessel or barrel from the stencil brush, and must contain the following words: "Approved, flash test degrees, Iowa." And also the name of the inspector, date of inspection, and degree of test. It must also be arranged for adjustable dates, and the degrees of test.

RULE 8. Brand number two shall be square in form, not less than seven inches outside measurement, without date, and must contain the following words: "Rejected for illuminating purposes....., inspector, Iowa." It must contain the name of the inspector; it must be affixed to all packages, casks, cans, barrels, or vessels containing kerosene which does not flash at a point above 105 degrees Fahrenheit. It must also be affixed to all packages, casks, barrels, or vessels containing gasoline, naptha, or benzene.

Brand number three shall be of like form and dimensions as brand number one, and shall contain the words: "For illuminating cars, approved (or rejected as the case may be)degrees, Iowa 189.....Inspector." It shall have adjustable spaces for dates, degrees, and the words "approved" and "rejected." It must also contain the name of the inspector. No oil must be approved for illuminating cars that burns at a temperature below 301 degrees, Fahrenheit.

Stencil brands must conform to patterns, on file in the office of the Secretary of the State Board of Health.

RULE 9. The inspector's brand must be placed on the package, cask, or barrel, in clear, distinct letters, and must be affixed by the inspector in person, or by some person under his personal supervision and control, who is not directly, nor indirectly, interested in the manufacture nor sale of any product of petroleum. The brand of an inspector is deemed to be his official signature, and must not be permitted to pass out of his custody or control.

RULE 10. Upon the inspection of oil by an inspector, the inspector shall deliver to the owner of the oil, or the person for whom the inspection was made, a certificate of inspection, which shall be in the following form:

APPROVED TEST.

Brand of oil.	Degrees.
.....
.....
.....
.....
.....
.....

REJECTED TEST.

.....
.....
.....

APPROVED TEST.

Brand of oil.	Degrees.
.....
.....
.....
.....
.....
.....

REJECTED TEST.

.....
.....
.....
.....
.....

[FRONT]

[STUBS]

Total fees \$..... 100

No. barrels approved.....

No. barrels rejected.....

Total No. barrels @ inspected

For whom inspected.....

Date of inspection.....

No. of certificate.....

Inspector.

OIL INSPECTOR CERTIFICATE

[PRESERVE THIS CERTIFICATE]

\$..... 100

RECEIVED OF

as fees for the inspection of Barrels

ILLUMINATING OIL, under Chapter 11, Title XII, Code as amended by Chapters 60 and 61,

Laws Twenty-seventh General Assembly).

No.

Dept. Inspector.

[BACK]

RULE 11. Where oil of different grades, or standards, is placed in receiving or storage tanks, an inspection must be made, and the actual standard of oil from such tanks obtained at all times before it is put into barrels for sale and use. There must be no average test, by taking an average of the different qualities or standards of oil before it is placed in such tanks. The inspector must know the quality and standard of the oil before he affixes his brand thereon. Where a number of barrels are filled consecutively from a tank, previously inspected, an inspection of one barrel would suffice for that particular lot of barrels, *provided*, no oil has been added to the tank during the process of filling the barrels. The barreling, testing and branding must constitute one transaction. There must be no lapse of time therein. The statute requires all products of petroleum, kerosene as well as gasoline, to be inspected and branded. The branding is notice to the public of the inspection. The statute makes no distinction in the form or size of the vessel in which such product is placed. It is no less imperative that when fifty gallons of kerosene are drawn from a tank into five ten-gallon cans that the cans should be branded than that fifty gallons of kerosene taken from the same tank and put into a barrel be branded. When a product of petroleum to be used for illuminating purposes has been inspected, the fact of such inspection must be shown upon the vessel from which it is to be sold again or used. When inspected in a storage tank or tank-car, it need not be re-inspected when barreled or canned, but the barrel, can or package must be branded according to the actual standard of the article contained therein. The barrel or vessel must not be branded before filling.

Empty barrels to be subsequently filled with gasoline may be branded with stencil number three as "rejected for illuminating purposes."

RULE 12. Oil received from jobbers in barrels is frequently of various standards, and the actual standard cannot be ascertained except by a separate test of each barrel. There must be no average or cumulative tests. For instance, a sample of oil taken from five barrels of 102 degree oil and five barrels of 108 degree oil would give a mixture that would, when tested, cause the whole ten barrels to be rejected, whereas five barrels, separately tested, would have to be approved. Averages are not permissible in the inspection service. Every barrel must be tested.

RULE 13. Where oil is shipped into this state in barrels, or from one point in this state to another point in this state, that has not been lawfully inspected within this state, each and every barrel must be inspected and the oil therein tested. The testing of one barrel will not authorize an inspector to brand the entire number as of the standard of the barrel tested.

The practice of jobbers in delivering oil to retail dealers without inspection is a direct violation of law. The delivery constitutes *prima facie* evidence of sale. A retail dealer receiving a lot of uninspected oil cannot justify himself for selling such oil on the ground that the jobber is responsible to the state for the violation of law. He must immediately notify the inspector that the oil is in his possession. Inspectors must exercise diligence to arraign offenders and stop the practice. They must, with strict impartiality, insist upon obedience to law in their respective districts.

RULE 14. Oil in transit must not be inspected outside of the district to which it is sent.

RULE 15. In case of a lamp explosion the inspector in whose district the accident occurred shall immediately investigate all the facts in connection therewith and report the same to the State Board of Health.

RULE 16. Inspectors must regard their duties as inspectors paramount to all other duties, and upon notification must perform them without delay.

RULE 17. No thermometer shall be used by inspectors for testing oil unless the same has been calibrated and tested for errors at the observatory at Yale college, and a certificate secured showing the result of the calibration. A copy of all such certificates shall be sent to the secretary of the State Board of Health, and recorded in his office.

The law relating to the inspection of kerosene was amended by the twenty-seventh general assembly as follows:

Chapter 61—Appointment of Deputies. **SECTION 1.** Amend section twenty-five hundred and three (2503) of the Code by adding thereto the following:

“Where there are two or more inspection stations, under the jurisdiction of the same inspector, he may with the approval of the governor appoint a deputy or deputies, each of whom shall be a resident of the state and not interested directly or indirectly in the manufacture or sale of petroleum products, for all of whose official acts the principal shall be responsible, and who shall serve without additional compensation or expense to the state.”

MINERS' OIL

The Code has the following relative to the sale, use, and inspection of miners' oil:

“**SECTION 2493. Purity of Oil.**—Only pure animal or vegetable oil, paraffine, or electric lights shall be used for illuminating purposes in any mine in this state, and for the purpose of determining the purity of oils the State Board of Health shall fix a standard of purity and establish regulations for testing said oil, and said standard and regulations, when so determined, shall be recognized by all the courts of the state.”

“**SEC. 2494. Penalty.** Any person, firm or corporation, either by themselves, agents or employees, selling or offering to sell for illuminating purposes in any mine in this state any adulterated or impure oil, or oil not recognized by the state board of health as suitable for illuminating purposes as contemplated in this chapter, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined not less than twenty-five dollars nor more than one hundred dollars for each offense; and any mine owner or operator or employe of such owner or operator who shall knowingly use, or any mine operator who shall knowingly permit to be used, for illuminating purposes in any mine in this state any impure or adulterated oil, or any (oil that has not been inspected and approved by an inspector), or any oil the use of which is forbidden by this chapter, shall upon conviction thereof, be fined not less than five dollars nor more than twenty-five dollars.”

“(“**SEC. 2.** That section twenty-four hundred and ninety-five (2495) be stricken out and the following substituted therefor: ‘It shall be the duty of an inspector of petroleum products to inspect and test all oil offered for sale, sold, or used for illuminating purposes in coal mines in this state, and for such purpose he may enter upon the premises of any person. If upon test

¹ Parts in parentheses as amended by the twenty-seventh general assembly, chapter 60.

and examination the oil shall meet the requirements made and provided by the state board of health, he shall brand, over his own official signature and date, the barrel or vessel holding the same with the words "approved for illuminating coal mines." Should it fail to meet such requirements, he shall brand it over his own official signature and date, "rejected for illuminating coal mines." All inspection shall be made within this state, and paid for by the person for whom the inspection is made at the rate of ten cents per barrel or vessel, which charge shall be a lien on the oil inspected, and be collected by the inspector. Each inspector shall be governed in all things respecting his record, compensation, expenses, and returns to the treasurer of state and secretary of state as provided in sections twenty-five hundred and six and twenty-five hundred and seven of the Code. It shall be the duty of the inspector whenever he has good reason to believe that oil is being sold or used in violation of the provisions of this chapter to make complaint to the county attorney of the county in which the offense was committed, who shall forthwith commence proceedings against the offender in any court of competent jurisdiction. All reasonable expenses for analyzing suspected oil shall be paid by the owner of the oil whenever it is found that he is selling or offering to sell impure oil in violation of the provisions of this chapter. Such expenses may be recovered in a civil action, and in criminal proceedings such expenses shall be taxed as part of the cost.")

In pursuance with the provisions above quoted, the state board of health at a meeting held May 11-13, 1898, adopted the following rules:

RULE 1. The specific gravity of oil used for illuminating purposes in coal mines must not exceed twenty-two degrees, Tagliabue hydrometer, at sixty degrees temperature, Fahrenheit.

RULE 2. All oil must be tested in a glass footed cylinder, one and one-half inches in diameter and eight inches deep.

RULE 3. Fill the hydrometer jar to within three-fourth inch of the top, introduce the hydrometer, cool or heat as the case may be to sixty degrees, Fahrenheit. Allow the hydrometer to come to rest, read from below, and the last line which appears under the surface of the oil should be regarded as the true reading, care being taken that the hydrometer does not touch the sides of the jar when reading.

RULE 4. Fill a round, clear glass bottle two-thirds full with the oil and shake well; the bead should not show fluorescence similar to that of petroleum products.

RULE 5. Fill an ordinary miner's lamp with the oil, light and note character and quantity of smoke.

RULE 6. All material used for illuminating purposes in coal mines shall be free from smoke, bad odor, and by-products of resin, known as mystic oil.

RULE 7. Paraffine wax should not contain more than three per cent of oil, and the maximum melting point shall be one hundred and ten degrees Fahrenheit. To test the melting point of paraffine wax, place a chip of it on hot water, then allow the water to cool slowly, and note the temperature of the water when the wax globule loses its transparency.

RULE 8. In all cases of doubt, or question as to inspection, or as to the purity of the oil or paraffine to be used in mines, a sample of the same shall be furnished the state board of health for chemical analysis.

All oils, therefore, sold by dealers, or their agents, or furnished by mine owners, or operators; or used by miners in any of the coal mines of Iowa, for illuminating purposes, shall, previous to such use, have been duly inspected and branded by some district oil inspector, legally qualified by the state.

LINSEED OIL

Chapter 52, laws of the twenty-seventh general assembly, relating to the sale of linseed (or flaxseed) oil, imposes new duties upon the state board of health and upon the oil inspectors of the state. Sections 4 and 5 relating to the "duties and powers of inspectors and board of health" and "the cost of analysis," are as follows:

SEC. 4. Duties and powers of inspectors and board of health. It shall be the duty of the inspectors of petroleum products, under such rules and regulations as the STATE BOARD OF HEALTH may prescribe, to enforce the provisions of this act. The violation of any of the provisions of this act relating to the manufacture and adulteration of linseed or flaxseed oil is hereby declared to be a public nuisance, and any court of competent jurisdiction is authorized, upon application of the board of health or its agents, to enjoin such violation, in the same manner as injunctions are usually granted under the rules and practice of such court. The board, its inspectors, assistants, experts, and chemists, and others appointed by it, shall have access, ingress, and egress to and from all places of business and buildings where linseed or flaxseed oil is kept for sale, stored or manufactured. They shall also have the power and authority to open any tank, barrel, can, or other vessel containing such oil, and may inspect the contents thereof, and take samples therefrom for analysis. All clerks, bookkeepers, express agents, railroad agents, or officials, employes of common carriers, or other persons, shall render them all the assistance in their power, when so requested, in tracing, finding, or inspecting such oil.

SEC. 5. Cost of analysis. It shall be the duty of the court in every action brought under this act to tax as costs in the cause, the actual and necessary expense of analyzing the linseed or flaxseed oil which shall be in controversy in such proceeding; provided, that the amount so taxed shall not exceed the sum of twenty-five (25) dollars. It shall be the duty of the county attorney, upon the application of the state board of health, to attend to the prosecution in the name of the state, of any suit brought for violation of any of the provisions of this act within his county.

CIRCULAR No. 8, 1901

Information, with Recommendations Respecting

SMALLPOX

AND

Rules in Relation to Quarantine and Disinfection

ISSUED BY THE

Iowa State Board of Health

Revised Edition

SMALLPOX

Definition: Smallpox—Variola—A pimple. First applied to this disease in France and Italy in 570 A. D. It is highly contagious, extremely dangerous, and a much dreaded disease by the people of all the nations of the earth. The symptoms vary very much, from the mildest type to the most malignant, the mildest type communicating the disease as well as the severest. It has existed from time immemorial in India and Africa. A severe epidemic prevailed in Rome A. D. 160, and in China A. D. 200. It did not invade England until the thirteenth century, and Germany and Sweden in the fifteenth century. It reached America, via the West Indies, early in the sixteenth century, destroying whole tribes of the natives. Outbreaks of the disease have always been very severe among the Indian tribes. In 1874-5 a half million people fell victims to the disease in India. Since vaccination has been known and practiced, it has lost much of its malignity and terror. It is computed that in the century preceding vaccination, fifty million people succumbed to the disease. McCauley called it "the most terrible of all the ministers of death." Dr. Watson says: "There is no contagion so strong and sure as that of smallpox, and none that operates at so great a distance." Susceptibility is almost, though not quite, universal. Carefully kept statistics show that no age is exempt. The negro race is especially prone to contract the disease, and its malignity is greatly increased among them.

It is an acute, contagious and infectious disease, characterized by an eruption which passes through the stages of macule, papule, vesicle, and pustule or crust, ending in desiccation and desquamation. The mucous membrane in contact with the air may also be affected. Severe cases may be complicated with cutaneous and visceral hemorrhage. If of microbic origin, the germ has not been discovered.

The contagium develops in the system of the smallpox patient and is reproduced in the pustule. It exists in the secretions and excretions, and in the exhalations from the lungs and skin, and may live for months on clothing and furniture. The dried scales constitute by far the most important element, and as a dust-like powder are distributed everywhere in the room during convalescence. The disease is probably contagious during the first three or four days previous to the eruption. The poison is of unusual tenacity, and clings to infected localities, showing the absolute necessity of thorough disinfection after its termination.

One attack confers immunity for the future, except in rare instances. The lightest attack protects, as a rule, for life. A second attack, should it occur, is usually, but not always, milder. Chronic diseases of the lungs, heart, kidneys, etc., do not diminish liability. It co-exists, with other infectious diseases, such as scarlet fever, measles, whooping cough, etc.

Epidemics occur more frequently in the colder months of the year, and the disease is also more malignant during these periods. But no age, race, sex or climate is exempt.

SYMPTOMS

Smallpox occurs under three distinct heads:

I. *Variola Vera*.

- (a) Discrete.
- (b) Confluent.

II. *Variola Hemorrhagica*.

- (a) Black smallpox.
- (b) Hemorrhagic pustular form.

III. *Varioloid*.

Smallpox modified by vaccination.

The disease is characterized by various stages:

I. That of incubation, from the time of exposure until the initial symptoms begin—seven to twenty-one days. Usually few if any symptoms occur during this period.

II. Invasion. In adults the disease is generally ushered in with a chill; children may have convulsive moments. There may be repeated chills during the first twenty-four hours, except in the milder forms of the disease. Severe frontal headache, lumbar pains and vomiting are almost constant symptoms. The pains in the back and limbs are more severe than in other eruptive fevers during this initial period.

Headache and vomiting are frequently persistent and severe. These symptoms, during the period of invasion, assist in making an early diagnosis, often days before the eruption is sufficiently characteristic to enable one to do so.

The early and rapid rise in temperature, reaching 103 to 106 degrees Fahrenheit, takes place frequently on the first or second day. The pulse is quick and full. Delirium in severe cases is also characteristic, especially when accompanied with high fever. There is a profound impression made upon the nervous system. The person is restless, distressed; the face flushed. The eyes may be bright and clear. As a rule the skin is clear, but there may be profuse sweats. In children these symptoms may be aggravated, especially the delirium. In this stage of invasion, and before the true eruption makes its appearance, we have in some cases what is known as initial rashes which assume a diffuse scarlatinal rash, or a darker and more measly form, with here and there petechia. As a rule the whole body is not affected with this rash, but the inner surface of the thighs, axillæ, etc.

The scarlatinal and also the measly form of the rash that may spread over great portions of the body, causes many errors in diagnosing the case. Physicians often claim the disease is something else than smallpox. But in due course of time the true eruption appears, and then the disease can be diagnosed quite readily.

III. *Eruption* occurs under two forms:

- 1. Discrete.
- 2. Confluent.

Usually on the third or fourth day small red spots appear on the forehead, about the roots of the hair, or on the wrists. Within twenty-four hours

after their first appearance they occur more thickly over the face and extremities, and perhaps a few on the trunk. As the rash comes out the fever subsides and the patient feels much more comfortable.

In the confluent form the initial symptoms are more severe. It is only as the disease progresses that the rash assumes the confluent form. On the fifth or sixth day the papules become vesicular; the summits become clear, circular, and soon become depressed in the center, umbilicated. Some two days later the clear fluid becomes yellow, pustular; the top becomes more rounded again, and assumes a grayish yellow appearance. An areola appears around the base of the pustules, and the intervening skin is swollen. The maturation first takes place and follows the order in which it appeared. The temperature now rises; a secondary fever makes its appearance. The swelling about the pustules is attended with a good deal of pain; the eyelids swollen and closed, especially in the confluent form, and delirium may again ensue. About the tenth day the scabs begin to dry, the fever subsides again, and the crusts now begin to fall off. By the fourteenth or fifteenth day desquamation will be far advanced on the face. There may be pustules in the mouth and throat, insomuch that the voice is thickened or altogether lost. The amount of pitting depends upon the severity of the disease.

When death occurs it is usually about the time the pustules begin to dry up, or the tenth to the twelfth day of the disease. In many of the severer cases the glands of the throat are badly swollen and sometimes suppurate.

The patient presents a terrible picture, unequaled by that of any other disease, which justifies the horror and fright which smallpox gives rise to in the public mind.

In the confluent form the virulence of the poison is greatly increased and deaths are more frequent. The period of desiccation is prolonged from three to four weeks. The crusts adhere much longer and the pitting extends much deeper.

Until the present epidemic of smallpox began, now some three or four years ago, this disease was, as a rule, easily preventable. Its fatal, loathsome character, and its terrible ravages in pre-vaccination days, had inspired the people with such a horror of smallpox as to cause them to flee from its presence, to readily submit to vaccination for protection against it, and to aid the authorities in all efforts to limit its spread. While mild, masked cases of smallpox were continually occurring, in most instances the symptoms were well marked, and the disease easily recognized, even by physicians who had not previously seen cases of smallpox.

The present epidemic is quite different in many of its features, being of such a mild type that it has added greatly to the difficulties health authorities encounter in controlling it. While but comparatively few deaths have occurred, much suffering has been caused, and a great loss to individual communities by the expenses of quarantine, disinfection, and the destruction of property; and above all, by the loss and interruption of trade. It behooves every community—for financial if for no higher reasons—to be prepared to enforce prompt, vigorous, and above all, intelligent measures to suppress the disease upon its first appearance.

II. Hemorrhagic smallpox is much more malignant and occurs under two forms. The first or the petechial form is denominated black smallpox,

death occurring in from two to six days. In the hemorrhagic pustular form the disease presents the ordinary symptoms until the vesicular or pustular stage is reached, when hemorrhage occurs in the pocks or from the mucous membranes. It is less frequent in childhood.

III. Varioloid is used to designate the modified form of smallpox, found in cases that have been successfully vaccinated. It will communicate the disease as well as the true smallpox. The symptoms vary very much from a mild form ordinarily to a quite severe one. The headache and backache may be severe. The papules appear about the third day, are few in number, and generally confined to the face and hands. There is not often pitting.

COMPLICATIONS

Considering the severity of the disease the complications may be said to be few. Laryngitis exists in some cases and extends to the nose and throat, and in severe cases produces gangrene and death. Diarrhoea occurs more frequently in children. Albuminuria exists in many cases, but true nephritis is rare. Inflammation of the ovaries or testes may occur. Boils frequently occur during convalescence. The eyes become inflamed, the lids glued together with the purulent discharge, and in severe cases the sight is destroyed. During convalescence pains in the joints resembling rheumatism are not infrequent. But the most serious complications are affections of the nervous system. Convulsions may occur in children, with delirium during the pustular state and post fibrile insanity, sometimes resulting in fatal coma.

DIAGNOSIS

Smallpox, like fire, is easily stamped out in the beginning. The disease should never be mistaken for chickenpox, cerebro-spinal fever, measles, scarlet fever, or impetigo contagioso. Great care should be exercised in making a diagnosis, and if proper care and attention are given to the clinical history and the symptoms—very few mistakes need occur even in the mildest cases.

PROGNOSIS

In persons unprotected by vaccination, smallpox in its common form is a very fatal disease. The death rate, however, varies in different epidemics, ranging from 0 to thirty per cent. The hemorrhagic forms are invariably fatal, and a majority of those having the confluent form die. In young children the mortality is indeed grave. Death results from the system being overwhelmed with the poison. Throat and lung complications, when occurring in children or in old age, are quite fatal.

PREVENTION AND VACCINATION

Vaccination is the means par excellence for the prevention and mitigation of the disease. The vaccine must be pure.

Vaccination has rarely caused undesirable results except in cases when uncleanly methods have been employed in collecting or inserting the lymph, and as at present conducted the operation is free from all objection.

The protection afforded by successful vaccination is probably quite as effective as that produced by a previous attack of smallpox, but there is much uncertainty concerning the duration of this immunity. The operation

of vaccination should be conducted with aseptic precautions, and none but glycerinated lymph from a trustworthy producer should be employed. After the arm has been bared the clothing should be securely held away from the site of the proposed abrasion, and the surface should be made clean by thorough washing with warm borax water. After drying with absorbent cotton the skin is scarified in one or more places by the use of a needle which has been rendered sterile by passing it through the flame of an alcohol lamp. One drop of the glycerinated vaccine is then applied and rubbed in with the needle. The clothing should not be allowed to touch the wound until it is dry, and an improvised shield, made by using a large paper bottle-cap, held in place by two strips of adhesive plaster, extending not more than half way around the arm, affords desirable protection for the first six hours.

Vaccination, when successful, will in three or four days produce a small papule which becomes vesicular and is surrounded by a circumscribed areola. This continues to develop till the seventh or eighth day, gradually forming a crust, which falls off, showing the scar which is characteristic. This all occupies from eighteen to twenty-one days. In this State all children should present a certificate of successful vaccination before entering any school. Immediate vaccination after exposure should not be neglected.

QUARANTINE

Upon the outbreak of smallpox the physician called, or where no physician is in attendance the householder where the case may be, should immediately notify the mayor or township clerk of the same, whose duty it shall be to at once quarantine the premises as directed by the rules of the State Board of Health. They should provide for suitable medical attendance where such has not already been done. An immune nurse should if possible be provided also, and whatever may be necessary to prevent the spread of the disease and to provide for the care and comfort of the sick. Special hospitals for the care of patients suffering from infectious diseases have proved of great value in controlling the disease, and this is especially true with smallpox. Insolation of not only the sick, but also of those who may have been exposed, is absolutely necessary to prevent the spread of the disease. When the disease has become epidemic, a daily house to house inspection is necessary to prevent its spread. Also all persons who have been exposed should be vaccinated, and those whom the virus failed to take effect upon should be re-vaccinated. Cases of varioloid should always be treated as cases of genuine smallpox, as they are equally dangerous in spreading the disease. Quarantine shall be established and maintained in each and every case of smallpox for forty days. (See rules and regulations of the State Board of Health, circular No. 1.

In most instances smallpox patients will be treated in their homes. The board of health is morally, if not legally, bound to use every necessary precaution to protect the public against danger from smallpox patients. As soon as a case or suspected case of smallpox is declared, or found, a quarantine notice should be served in writing upon the head of the family, or other person responsible, requiring all inmates of the house to remain in until further notice, and prohibiting other persons from entering the house. If the case is reported as smallpox the house should be placarded "SMALL-POX." Inquiry should be made of the whereabouts of any absent members

of the household; and if they have been exposed to the disease they should be promptly returned to the house and quarantined. If any such person has left the community, and his whereabouts can be learned, the authorities of the community to which he has gone should be notified. A list of all other persons who have been exposed to the patient, as far as possible, should be written down. These persons should be found and quarantined in their homes.

What shall be considered "exposure to smallpox?"

It is possible for smallpox to be communicated during the stage of primary fever to those in close contact with the patient; there is but little danger prior to the appearance of the eruption. For practical purposes the line between exposure and non-exposure, except for the members of the household, may be fixed at the *beginning of the eruption*. It has frequently happened during the present epidemic that smallpox patients, after the eruption appeared, have been up and about; on the street, at work, or in school, so that a large number of persons were exposed. It may be difficult in such instances to determine whether all such persons, or which of them, should be quarantined. To pass such a patient upon the street should not be considered a serious exposure; to shake hands with the patient would be. If the patient is going to school after the eruption appears, all the children in that particular school-room should be counted as having been exposed; other school children would possibly be.

Good judgment must be used in deciding all such cases, erring, if at all, on the side of safety to the public.

When recovery occurs the patient should not be discharged until desquamation has entirely ceased, nor until the redness at the bottom of the pocks has disappeared. The surface of the body should then be bathed in a solution of bichloride of mercury (1 to 1,000), and afterwards washed with water. Clean clothing should then be provided.

BURIALS

Rule 24 of regulations in regard to contagious diseases, 1899, says:

"A body dead from smallpox must be immediately wrapped in a cloth saturated with the strongest disinfectant solution, 1 to 500 bichloride of mercury, without previous washing, and cremated or buried deep, and no body dead from this disease shall, under any circumstances or after any lapse of time, be disinterred.

"No public funerals shall be held after deaths from smallpox. The coffin or casket containing such bodies shall not be taken into any school house or church or any building, room, or place used for church purposes, or for any public assembly, nor shall such coffin or casket containing such body be opened, nor shall any child be permitted to act as pall bearer or carrier at such funeral. Neither shall such body be deposited in a receiving vault.

PRECAUTIONS IN THE IMMEDIATE PRESENCE OF AN EPIDEMIC

The state board of health recommends that in whatever city, village or town smallpox appears, the entire neighborhood in which there has been any communication with the patient, or exposure to the contagion, shall be notified that the *state board of health requires that every person shall be protected by vaccination*; that tramps and other persons suspected of infection with

smallpox shall be taken in charge by the police and sanitary authorities; that employers shall advise their companies of employed persons to be vaccinated, and in case of smallpox in their vicinity, *shall make such vaccination one of the conditions of being continued in employment.* This rule should be strictly enforced in all manufactories that make goods which are liable to become infected, and especially should be a standing regulation in *paper mills, in public houses, and among all classes employed on railroad trains and passenger vessels.*

PRECAUTIONS IN THE FAMILY

Every member of the family in which a case occurs should be vaccinated afresh.

PRECAUTIONS IN THE SICK-ROOM

The patient should be placed in one of the upper rooms of the house, the farthest removed from the rest of the family, where is to be had the most complete ventilation and isolation. The room should be instantly cleared of all curtains, carpets, woolen goods, and all unnecessary furniture. The rooms should be kept *constantly well ventilated*, by means of open windows, and of fires, if necessary. The utmost cleanliness should be observed both with regard to the patient and the room.

The nurse and patient should have no direct communication with those not quarantined. There should be no passing of notes, letters, papers, books, etc., from the sick-room to those on the outside. All food should be prepared and placed outside the room where the nurses can get it; and all remains of food, left after a meal, dishes, and everything that has been taken into the room of the sick person must be disinfected. The food remaining should be burned, dishes placed in a disinfectant solution before leaving the sick-room. Milk of lime answers well for this purpose. Towels, handkerchiefs, aprons, and all loose clothing should be placed in a basin and immersed in a solution of formalin or carbolic acid, a five per cent solution, and boiling water poured over them, or what is better, the boiling the same in the disinfecting solution, that all germs may be destroyed. For disinfecting the stools the milk of lime answers well; this should be prepared each morning, sufficient for the day; ten per cent of this should be added to sufficient water to cover the excreta, and then left standing at least two hours before it is burned or buried.

DISINFECTION.

Disinfection in smallpox should always be done by the board of health, or under its direct supervision. It requires knowledge and care to properly disinfect a house where smallpox has occurred, and this should never be left to the family. The disinfection of excretions, towels, bedding, etc., during the patient's illness, will generally be looked after by the attending physician, but the board of health is to be held responsible for the disinfection of the house and its contents after the patient has died or recovered.

Clothing, bedding, etc., which have been in contact with the patient, *and which cannot be boiled in water*, should be burned. The best plan to disinfect all fabrics that may be placed in water is by boiling them for one hour. This should be done after the rooms are fumigated.

To prepare a room for disinfection by fumigation close all exits for gas,

such as chimneys, window and door cracks, key-holes, etc. Open closet doors, bureau drawers, etc. Hang clothing, bed covers, etc., on lines stretched across the room.

Formaldehyd gas has now been shown to be an efficient disinfectant when properly used. Its advantage over sulphur is that it does not tarnish metals or injure colored goods. It can be depended upon to disinfect *only the surface* of things.

There are a number of efficient formaldehyd generators on the market. It should be capable of rapidly generating formaldehyd gas; and should be large enough to disinfect large rooms. No less than ten ounces of the formaldehyd solution (formalin 40 per cent), should be used for each 1,000 cubic feet of air space, and proportionately larger amounts for larger rooms. Better results are claimed by adding ten per cent of glycerine to the formalin. The temperature of the room should not be below sixty degrees Fahrenheit. The room should be kept tightly closed for not less than eight hours. By placing a few shallow dishes containing ammonia water in the room when it is opened the fumes of the formalin may be rapidly dissipated.

After fumigation, carpets, clothing, bed covers, etc., should be hung out of doors and thoroughly aired and sunned. Dependence should not be placed upon fumigation alone. It should be supplemented, especially for the room occupied by the patient, by washing with a disinfectant solution all woodwork, windows, window-sills, floors, etc. A five per cent solution of formalin, or of carbolic acid, or a solution of corrosive sublimate, one drachm to a gallon of water, is suitable for this purpose.

Remember that these substances are poisonous.

If the patient, during the disease, has had the liberty of the entire house, every room in it, and its contents, should be disinfected by fumigation.

CAUTION TO BE OBSERVED BY NURSES AND PHYSICIANS

There has been too much carelessness—especially during this present mild form of the disease. Nurses, after entering the ward in the detention hospital, or the sick-room, should be under a strict quarantine as long as his or her services are required; during the continuance of the service the nurse must not leave the premises nor come in contact with the well. After the close of the case or cases, he should take a full bath with some disinfectant solution, thoroughly cleansing the body, then a complete change of clean, sterile clothing.

Physicians in the discharge of their duties should exercise the greatest care, that they may not carry the germs of the disease from house to house. An outer garment completely covering the ordinary clothing, should be put on before entering the house or sick-room, and upon retiring should remove this clothing; should wash his hands, beard, hair, and other portions of the body with a solution of bichloride of mercury 1 to 1000, and sprinkle the clothing worn in the sick-room with some of the same. No physician would wilfully expose another to the germs of an infectious disease. Great caution should be observed in this respect.

APPENDIX

RULES ADOPTED BY THE BOARD.

CONTAGIOUS DISEASES

RULE 1. It shall be the duty of every physician residing or practicing within the limits of any city, town or township to give written notice to the mayor, or township clerk (as the case may be) of any case of Asiatic cholera, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, measles, whooping cough, leprosy, or puerperal fever, that he may be called to attend professionally, within twenty-four hours after he shall first visit and ascertain the character of any such disease named herein. In all cases where no physician is in attendance, it shall be the duty of any person having charge of, or being at the head of any family, or having the care or custody of any lodging rooms to give notice in like manner as required of physicians. Every school teacher and school officer who discovers, or who has knowledge of a case of these contagious diseases, shall cause the fact to be immediately reported to the mayor, or clerk of a township.

RULE 2. It shall be the duty of the mayor or township clerk (as the case may be), upon receiving written notice of the existence of a case of Asiatic cholera, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina or scarlet rash), to forthwith quarantine the premises, by serving written notice to the occupants thereof, and placing a danger card thereon; and take such measures as may be necessary and proper for the restriction and suppression of such disease; and to investigate all the circumstances attendant upon the occurrence of the same. He shall also make proper provision for care of the sick. Where the disease is measles or whooping cough, the premises shall not be quarantined, but they shall be placarded with the danger card.

And it shall be the further duty of the mayor or township clerk (as the case may be) to disinfect or cause to be disinfected, the premises whereon such quarantined diseases have occurred, together with all infected furniture, bedding, clothing and other articles, as provided by regulations of the State Board of Health.

RULE 3. If any person shall wilfully or maliciously remove or deface, or cause to be removed or defaced, any signal of danger, or cloth or card placed upon the quarantined premises, without the proper authority as provided herein, he shall be prosecuted, as provided by law.

RULE 4. During the existence of any contagious or infectious disease, in any family, or household, or place, in any city, town or township, and until after the recovery of the sick and the disinfection of the premises where

such disease shall have existed, no person residing in such household, family, or place, shall be permitted to attend any public meeting, and no superintendent, teacher or officer of any school shall permit any child or person from any such family, household, or place, to attend any school without a permit from the mayor or township clerk (as the case may be), upon the recommendation of the attending physician, showing thorough disinfection of the person, clothing and premises. School teachers who are boarding in a family in which a contagious disease exists, must at once change their place of boarding and lodging, and change and disinfect their clothing.

RULE 10. Whenever there is complete recovery or death of persons who have been sick with a contagious disease, and there are no further exposures thereto, the quarantine may be released, although the period prescribed herein has not elapsed. *Provided*, that no release of quarantine shall be permitted until the following conditions have been complied with:

First—Seventeen days must have elapsed after the recovery or death of the last case. The attending physician and the health officer shall together determine the proper date for raising the quarantine.

Second—The entire body of the patient and exposed individuals must be thoroughly washed with five per cent solution of formalin, or with a one to two thousand solution of bichloride of mercury.

Third—In case of smallpox, attention to the following additional requirements is imperative. Unvaccinated individuals must be vaccinated at once and kept under quarantine until evidences manifest themselves that the vaccination has been successful. Requirement No. 2 must then be carried out and the individual dismissed. If the vaccination should fail to succeed in the normal period of time, the quarantine must be continued until seventeen days after date of exposure, when requirement No. 2 may be complied with and the individual released. Persons who are able to show proof that they have been efficiently vaccinated within the preceding three years before the date of exposure, are subject to requirements of No. 2 only.

Persons who have not been vaccinated within a period of three years preceding the date of exposure must be dealt with as unvaccinated individuals according to requirement No. 3.

RULE 11. After death or recovery of persons sick from a contagious or infectious disease, the room, furniture, and other contents not to be destroyed, shall be thoroughly disinfected in accordance with regulations made by the state board of health.

RULE 12. No order for the release of quarantine shall be made by the mayor, or township clerk (as the case may be), except upon a report from the attending physician stating the number of persons on the quarantined premises sick with the infectious disease in question, their names, ages, and when the disease first appeared in each case, when recovered, and the means, if any, used for disinfection. If the mayor or township clerk (as the case may be), shall find that the regulations of the local board and of the state board of health respecting quarantine and disinfection have been complied with the quarantine shall be forthwith released. If quarantine regulations have been complied with, and proper disinfection has not been done, the mayor, or township clerk (as the case may be), shall order it done under

the supervision of the health officer or some other competent person, and the quarantine shall be continued until it is done.

RULE 13. No person shall give, lend or sell, or offer for sale, any clothing or other articles liable to convey infection of any contagious disease unless the same have been disinfected and such disinfection approved by the mayor or township clerk (as the case may be).

RULE 14. When Asiatic cholera, smallpox, diphtheria (membranous croup), scarlet fever (scarlatina, scarlet rash), typhoid fever, leprosy, measles, puerperal fever, or any other contagious disease exists in any house or dwelling place of a dealer in, or seller of, milk he shall discontinue, to give, sell or distribute milk to any person, or to creameries or butter factories, or in anywise handle such milk, until a permit is granted therefor by the mayor or township clerk (as the case may be), countersigned by the health officer. And no person who attends cows, and does the milking, or has care of milk vessels, or the sale or distribution of milk, shall be permitted to enter any premises or place wherein exists any of the diseases named herein, nor have any communication, direct or indirect, with any person who resides in, or is an occupant of such infected place; nor shall any milk or butter be given away, sold or distributed from such infected place. Any person, either as principal, agent or employe, who shall violate any of the provisions of this rule shall be prosecuted according to law.

CIRCULAR No. 6

RULES FOR THE PREVENTION AND RESTRICTION OF CONTAGIOUS DISEASES AMONG DOMESTIC ANIMALS

OFFICE OF THE IOWA STATE BOARD OF HEALTH, {
Des Moines, January 19, 1898. }

Pursuant to authority vested by chapter 14, title 12, of the Code, section 2530, the state veterinary surgeon by and with the approval of the State Board of Health, and the executive council, does hereby make and establish the following rules and regulations for the prevention and restriction of contagious diseases among domestic animals:

RULE 1. All cattle brought within this State from any county or parish within the United States where pleuro-pneumonia is known to exist, shall be subject to quarantine for a period of not less than sixty days.

RULE 2. No person owning or having the care or custody of any animal affected with glanders or farcy, or which there is reason to believe is affected with said disease, shall lead, drive, or permit such animal to go on or over any public grounds, unenclosed lands, street, road, public highway, lane, or alley; or permit it to drink at any public water trough, pail, or spring; nor keep such diseased animal in any enclosure, in or from which such diseased animal may come in contact with, or close proximity to, any animal not affected with such disease.

RULE 3. Whenever notice is given to the trustees of a township or to a

local board of health, of animals suspected of being affected with glanders or farcy, said trustees shall immediately require such suspected animals to be isolated and kept separate and apart from all other animals until released by order of the state veterinary surgeon or some person acting by his authority.

RULE 4. An animal must be considered as "suspected" when it has stood in a stable with, or been in contact with an animal known to have the glanders; or if placed in a stable, yard, or other enclosure where a glandered animal has been kept.

RULE 5. Whenever any animal affected with anthrax, glanders or farcy, shall die, or shall be killed, the body of such animal shall be immediately burned, or shall have kerosene poured over it, and buried not less than four feet deep without removal of the hide, or any part of the carcass.

Reasons for Rule 5.—To prevent the possibility of a recurrence of these diseases from germs existing in the grave, which, if not destroyed by some powerful agent, will retain their vitality for a number of years, so as to impart the disease.

As they are communicable by inoculation to human beings, great precaution should be used in handling animals affected with this disease.

RULE 6. No animal diseased with glanders or farcy shall be deemed to have any property value whatever, and no appraisal thereof will be made.

Reasons for Rule 6.—Glanders is an incurable disease, and there is no warrant for expending public money in appraising property manifestly worthless, and which can be compensated for only at "its actual value in its condition when condemned." Also to prevent the introduction of diseased animals into the state, and the inoculation of worthless ones for speculative purposes.

RULE 7. Whenever the owner, or person having in charge any animal declared by the state veterinary surgeon or other authorized person to have the glanders, shall neglect or refuse to destroy said animal, the premises whereon such animal is kept shall be quarantined until such animal is destroyed and the premises thoroughly disinfected.

QUARANTINE

RULE 8. The term "quarantine" shall be construed to mean the perfect isolation of all diseased or suspected animals from contact with healthy animals, as well as the exclusion of such healthy animals from the yards, stables, enclosures, or grounds wherever said suspected or diseased animals are, or have been, kept.

RULE 9. So-called "piggy" or pregnant sows and rejected cattle found in railway or packing-house stock yards must not be sold nor delivered to farmers, but held subject to such quarantine as may be deemed necessary to prevent the communication of any contagious disease.

RULE 10. All hogs presented for the Iowa State fair and Sioux City fair shall be subject to examination by the state veterinary surgeon before entering the fair grounds, and to daily inspection during the exhibition. Should any animal be found diseased with hog cholera or swine plague, it must be immediately removed to a place of quarantine. The show-pens must be cleansed and disinfected under the supervision of the state veterinary surgeon before and during the fair.

RULE 11. In suspected cases of glanders and farcy, when the symptoms do not warrant the state veterinarian in condemning the animal, the Mallein test shall be recognized as a valuable diagnostic.

RULE 12. In suspected cases of bovine tuberculosis the tuberculin test shall be recognized as a valuable diagnostic.

DISTINFECTION

Among the most efficient and convenient agents for destroying disease germs, are heat, solutions of creolin, carbolic acid, sulphate of iron, caustic soda, or sulphate of copper, fumes of chlorine, chloride of lime, slaked lime, lime water, whitewash and kerosene oil.

Heat—This is conveniently applied by means of boiling water or oil, and is especially recommended for disinfecting fabrics of all kinds, leather or wood. Articles of iron or other metals may be purified by heating in a fire. All bedding, litter, excrement, etc., that have accumulated about animals affected with any form of contagious disease, and the carcasses, together with all blood or other fluid elements that have escaped from such carcasses and contaminated soil should be burned, as surest means of eradicating the disease.

Dirt or earth floors of stables wherein animals affected with glanders or anthrax have been kept, should be removed to the depth of four inches and burned.

SOLUTIONS

Creolin—One to fifty or one hundred parts.

Carbolic Acid—Add one part of the acid to five or ten parts of water or oil.

Sulphate of Iron, Copper and Caustic Soda—Add as much of the substance to a given quantity of warm water as will be dissolved.

Whitewash—For disinfecting interior walls of buildings, feed-boxes, mangers, yards, fences, etc., the application of a coating of whitewash prepared from lime in the ordinary way, so thoroughly done as to completely cover every part of the surface designed to be cleansed, is an economical method.

FUMIGANTS

Chloride of Lime—Chloride of lime and slaked lime for disinfecting floors, yards, carcasses and ground where dead or diseased animals have lain, in fine powder, should be scattered over the surface of objects to be disinfected thickly, so as to form a complete covering.

Chlorine—To generate, take peroxide of manganese (to be obtained at any drug store), place in an earthen dish and add one pound of hydrochloric acid (sometimes called muriatic acid), to each four ounces of the peroxide of manganese. Care should be taken not to inhale the gas.

After the floors, walls, etc., of a contaminated building have been cleansed, they should be fumigated by some of the foregoing agents. The doors should be closed, and the building otherwise made as tight as possible. Fumes should then be evolved in the building for not less than half a day, and the doors kept closed not less than twenty-four hours, when air and sunlight should be freely admitted.

BURIALS

Kerosene Oil—Carcasses buried in the earth, where there is danger of infection by exhumation by other animals should, previous to burial, be thoroughly covered with quicklime, or saturated with kerosene oil. This will tend to destroy the virus, and will prevent carnivorous animals disturbing the carcass and thereby spreading the disease.

Froezing—It has been demonstrated repeatedly in Iowa, that the frosts of winter thoroughly disinfect pasture lands that have been poisoned with the virus of Texas fever by herds of southern cattle during the summer months. From the first of April to the first of November, the virus is likely to retain its vitality, and the strictest precaution is necessary to prevent communication of the disease to northern cattle. The purifying effect of frost, however, cannot be relied upon for destroying the virus of any other disease than Texas fever, liable to attack live stock in Iowa.

It is for the interest of every community, on the appearance of contagious or infectious disease among animals, to adopt speedy measures to eradicate

the same, and to co-operate with the state veterinary surgeon in securing such results in the shortest possible time.

Approved, January 19, 1898.

NOTE—Chapter 14, Title 12, Code published with this circular will be found in the appendix of this report.

[Form 90B—1898.]

REGULATIONS FOR THE USE OF KEROSENE, GASOLINE AND PETROLEUM PRODUCTS.

OFFICE OF THE STATE BOARD OF HEALTH, }
DES MOINES

Kerosene may be said to be the middle product of petroleum, the upper being several volatile hydro-carbons known under the general term of naphtha, a highly inflammable substance, and the lower, of paraffine, heavier and less combustible than kerosene. Naphtha is a very dangerous explosive. An excess of naphtha in kerosene renders the kerosene dangerous. An excess of paraffine makes the kerosene heavy and less combustible.

The statutes of Iowa demand that so much of the naphtha shall be removed that oil, when heated to a temperature of one hundred and five degrees Fahrenheit, will not throw off a vapor which will ignite when in contact with a flame or lighted match. That is what is termed the flashing point. Extensive observation and experiment have demonstrated that this standard will give satisfactory results for illuminating purposes and be safe for use in ordinary lamps. It would not, however, be safe for kindling fires in the kitchen stove. No oil having a flashing point below one hundred and five degrees can be lawfully sold nor used for illuminating purposes in this state.

The flashing point should not be confounded with the burning point, or fire test, which signifies that degree of temperature or heat at which oil placed in an open vessel will ignite and burn without a wick. The fire test is not recognized by the Iowa statute, and has little or no value as determining the actual quality of the oil. Retail dealers should especially bear this in mind. Refiners and tank line companies frequently brand oil "one hundred and seventy-five degrees Fire Test," "Head Light, one hundred and seventy-five degrees," or other trade marks which have no relation whatever, under the law, to the actual quality of the oil. The brand of an Iowa inspector, indicating the flashing point, is to be deemed the actual quality and standard of the oil. The difference between the flashing and burning point of kerosene is ten to fifty degrees, the average being twenty to twenty-seven degrees, so that oil branded one hundred and seventy-five degrees fire test should have a flashing point of one hundred and twenty-six degrees. Hence, no person should be misled or deceived by the dealer who says an oil is one hundred and fifty degrees or one hundred and seventy-five degrees fire test. Look at the inspector's brand, get the degree of the flashing point there given, and add twenty-seven to it, and you will have very nearly the actual fire test. The law interposes no inhibition against trade marks,

except that no trade mark asserting a fraud can stand. The branding of oil one hundred and seventy-five degrees fire test that has a flash test below one hundred and twenty-six degrees is clearly an attempt to defraud the purchaser.

The flashing and burning points are independent of each other. The flashing point depends upon the amount of naphtha or volatile substance present, while the burning point depends upon the general character of the whole oil. The addition of only two per cent of naphtha would not affect the burning point, while it would lower the flashing point ten degrees. Hence the burning point or "fire test" is not deemed a reliable standard of safety.

The tendency of retail dealers is to purchase oil having a high flashing point, presumably on the theory that if oil having a flashing point of one hundred and six degrees is safe, that of one hundred and twenty-six degrees is so much safer. Theoretically that is true, but the higher the flashing point, the heavier the oil. Heavy oil congeals more or less in cold weather, will not rise freely, hence there is imperfect combustion. There is a limit to capillary attraction. Oil having a flashing point of one hundred and six degrees to one hundred and ten degrees will give better illumination, burn freer and with greater satisfaction in ordinary lamps, than an oil with a flashing point of one hundred and twenty degrees or one hundred and twenty-four degrees.

Heavy or high grade kerosene has more or less paraffine, which tends to harden and clog the wick, and over-heat the wick-tube. Such oil will not give good satisfaction in ordinary flat-wick lamps, and should be used only with burners and wicks especially adapted for heavy oil. The fire test of oil is made in an open cup. The flash test, under the Iowa law, is made in a closed cup. It is proper here to say, for the benefit of retail dealers, that experiments made covering thousands of tests have shown that the average difference between the burning and flashing point of oil when both tests are made in the same cup, is from twenty to twenty-seven degrees. The average difference between the flashing point of oil tested in an open cup, and the same oil tested in the Iowa (closed) cup is twenty-five to thirty degrees. The difference between the burning point of oil tested in an open cup and the flashing point of the same oil tested in the Iowa (closed) cup is from fifty to fifty-five degrees. Hence, commercial headlight carbon oil, that has a burning point, or fire test, of one hundred and seventy-five degrees tested as it always is by the refiner, in an open cup, should have a flashing point of one hundred and twenty-five degrees (minimum) to one hundred and thirty degrees when tested in the Iowa cup (closed). The specific gravity should not be above forty-five degrees Baume at sixty degrees Fah. If deficient in these requirements, as shown by the inspector's brand, a carbon oil cannot be deemed true commercial headlight oil.

LAMPS

Lamps should be of metal. Glass lamps should not be used in families where there are children. The bowl should be large in diameter, and shallow, not exceeding three inches in depth, so as to bring the flame as near the oil as possible, to secure an even combustion of all the contents. With deep lamps the wick will fail to raise the oil when half consumed; a crusted tube and over-heated burner, and deficient illumination is the result.

The base should be large and heavy, to prevent overturning.

They should be cleaned and filled every day, and once each week entirely emptied of their contents, to remove dregs and sediment.

When oil has been kept forty-eight hours in a half-filled lamp, a dangerous vapor forms. This will be released by the process of filling the lamp.

Never remove the top nor refill a lamp when burning.

Before lighting, turn the wick down even with the tube, and raise it gradually, from time to time, as the burner becomes heated.

Never blow down a chimney to extinguish a lamp. Turn the wick down until the flame flickers, then place your open hand behind the chimney top and give a quick puff of breath horizontally against your hand.

Do not fill a lamp to overflowing, as oil expands greatly as it becomes heated, and may rise up the wick tube and become ignited and dangerous.

During the day keep the lamp where the oil will not become warm. Never set it on a mantel over a fire-place, grate, or stove where there is a fire.

Never leave a lamp burning with the wick turned down. Air currents are liable to cause the chimney to break; the wick tube will then become greatly heated, and the lamp filled with dangerous vapor. A burning lamp with a broken chimney becomes liable to violent explosion in about fifteen minutes. A lamp should not be left burning at all in a vacant room or house. If a dim light is desired for a sick-room, place the lamp in another room, burning at the usual flame, leaving the connecting door ajar. Never leave a lamp turned low in a sick-room, nor for a "night light." Several explosions have been caused by this practice. Let the flame be at usual height at all times when in use.

BURNERS

The burner should be adapted to the oil to be used, whether heavy or light. It should be properly constructed for draft and ventilation for the escape of vapor from the vapor chamber of the lamp. It should burn without heating the burner—the cooler the better.

For heavy oil, a more liberal wick is required to raise the oil freely enough to supply the flame, hence two or more wicks are provided.

Burners should be kept perfectly clean inside and outside, and free from pieces of burned matches, charred wick, crustation on the wick tube, and accumulation of charred wick on the perforated disk. The disk is for the purpose of supplying draft and the necessary amount of oxygen of the atmosphere to consume the carbon of the oil. When the disk is clogged, imperfect combustion and smoke are the result.

Foul and ill kept burners are a more frequent cause of poor light than the oil.

To clean the wick turn it up even with the tube and rub the finger lightly across it to remove the charred surface.

Keep the vent-tube along the wick-tube into the lamp open and clean, as it is the safety valve of the lamp.

Gummed and clogged burners can be easily cleaned by boiling a few minutes in sal-soda or concentrated lye and water.

The important features of a lamp are safety, brilliancy of illumination, economy, cleanliness and durability. It becomes dangerous when the oil in

a lamp is heated over one hundred and six degrees. The space above the oil in a lamp in which the oil is unduly heated becomes filled with a highly explosive naphtha vapor. The higher the temperature of the oil, the more naphtha vapor is thrown off.

CHIMNEYS

It is desired to impress upon the people that the chimney is an important factor in illumination. It is, in fact, a necessary part of the burner, as much as is a gear wheel of a machine. It is made for the burner. Every burner made is a patented device, and requires a special chimney to secure the intended perfect combination. Over two hundred shapes of chimneys are made. If your stove or fire-place smokes, the chimney is wrong. If your lamp smokes or smells, the chimney is wrong, not the lamp nor the oil. If the draft is right, and a chimney on the lamp it is made for, there is perfect combustion; no smoke, no bad odor. The top should be cylindrical in form to secure the best draft.

WICKS

Probably not one person in one hundred gives a lamp wick thought or attention. Yet it is one of the most important factors in the burning of kerosene, as it is also one of the very probable causes of complaint of the unsatisfactory burning of oil. The markets are filled with cheap wicks, worthless and valueless at any price. Select a wick which will snugly fit the tube, yet move freely when saturated with oil. If it binds in the tube draw a few threads from it lengthwise. It should only reach the bottom of the lamp, and should be changed each month, as from long use it becomes hardened and does not raise the oil freely.

SAFETY BURNING FLUIDS AND LAMPS

The sale or use of so-called safety fluids, or of any oil for illuminating purposes, the product of petroleum, which has not been inspected in this state, and approved by a state inspector, is prohibited by law, except gasoline of seventy-four degree specific gravity may be used in the Welsbach incandescent lamp.

GASOLINE AND ITS DANGERS

First—Keep it in a well ventilated, cool place, inaccessible to children, never in any part of a dwelling.

Second—No unclosed vessel, as a pitcher, basin, or cup, containing gasoline should be carried or placed within ten feet of a burning stove, lamp, gas or flame of any kind, nor left standing in any room within a dwelling house.

Third—Gasoline should never be poured from one vessel to another in any room in which there is a lighted lamp or a burning gas jet, an open grate burning, or within ten feet of a stove in which there is a fire, as the current of air in a room is always toward a fire or a burning lamp, and the vapor of gasoline will be carried in that direction and will ignite at a long distance.

Fourth—It is dangerous to fill the reservoir of a stove when the burner is lighted, or near another stove in which a fire is burning. When not in use, close the cut-off between the reservoir and burner. This will prevent overflow from defect or leakage at the burner. If there be an overflow of

gasoline when filling the reservoir, or from the burner, wipe it carefully up before lighting the burner. If the overflow should become ignited smother it with a blanket or cloths. Do not throw water on it, as that spreads the gasoline and increases the danger. Flour will squelch the flames quickly. This is true of the accidental ignition of any quantity of gasoline or kerosene. Keep the reservoir continually closed air tight.

Fifth—If from leakage of a stove, or vessel, there is discovered an odor of gasoline in a room that has been closed, throw open the doors and windows until the air is changed before a match is struck, or a flame of any kind is permitted therein.

Sixth—Never kindle a fire with gasoline.

Seventh—Keep gasoline in a tight vessel, and after drawing therefrom place the cap over the spout and close the neck and vent-tube if there be one. This will prevent evaporation of the fluid. It is from evaporation, filling the air with an explosive vapor, comes the danger.

Eighth—Never attempt to clean gloves on the hand nor dresses with gasoline, near a flame or stove. The fire from the stove will draw the vapor from the gasoline through the crevices, and ignite it like a lightning flash. If gasoline is spilled upon your clothing remove the garment at once, keeping entirely away from flame of any kind. The deodorizing of gasoline for toilet use does not change its explosive nature.

[CIRCULAR No. 15—1898]

DISINFECTION OF WOOLEN-RAG MATTRESSES, BED QUILTS, CARPETS, RUGS AND UPHOLSTERED FURNITURE.

RULES AND REGULATIONS

It having come to the knowledge of the Iowa state board of health that the ordinary "wool" or rag bed-quilts and mattresses manufactured in Iowa, or imported into the state and largely sold therein, are composed of unsanitary and often filthy materials, and, therefore, are a menace to the public health; further, that it is a fact that danger to the public health also lurks in the upholstered furniture, the carpets, the mattresses and bed clothing stored for sale in the numerous second-hand stores of our towns and cities; and further, as we have reason to believe that the present methods of carpet cleaning, as exemplified in the carpet-cleaning establishments of cities and towns, are also menaceful to the public health; therefore, the Iowa state board of health decrees the subjoined rules, devolving upon local boards of health in this state, through the health officers thereof, the duty of their early and strict enforcement.

RULE FIRST

The proprietors, or managers, of all factories or stores in Iowa, which are devoted in whole, or in part, to the manufacture of so-called woolen-rag bed-quilts and mattresses, from and after the publication of these rules, are required to cause all rags, collected for use in the aforesaid industry, to be dusted, torn into small fragments, and rinsed in clean water—preferably under a forcible hydrant stream—before they are used in the manufacture of the woolen-rag bed-quilts and mattresses aforesaid; and when the completed article is ready to be put on the market, it shall, before being offered for sale, be thoroughly disinfected in the manner specified hereinafter. This rule as to the disinfection of completed woolen-rag mattresses and bed-quilts shall also apply to such articles elsewhere manufactured and imported into, and put on sale in, the state of Iowa.

RULE SECOND

It is ordered: That all mattresses sent to mattress factories for renovation, shall be subjected to thorough disinfection before being returned to their owners.

RULE THIRD

It is ordered: That all venders of second-hand upholstered furniture,

bed-clothing, carpets, rugs and mattresses, shall be required to disinfect such articles, in the manner hereinafter specified, before putting them on sale

RULE FOURTH

It is ordered: That all articles named hereinbefore, after having been disinfected in the manner specified hereinafter, shall, as evidence of that fact, have securely attached to each one a label, on which is printed, in large type, these words: "DISINFECTED IN ACCORDANCE WITH THE RULES OF THE IOWA STATE BOARD OF HEALTH." Said label to be provided and attached at the expense of the manufacturer or vender, under the possible supervision of the local health officer.

RULE FIFTH

It is ordered: That all carpets, rugs, etc., sent to a carpet-cleaning establishment for the purpose of being cleaned, shall be disinfected, after the dusting process has been completed, and in the following manner, to-wit: The carpets, rugs or other articles that have thus been cleaned in the said carpet-cleaning establishment shall at once be sprayed with a two-per-cent solution of formaldehyde, in the proportion of one fluid ounce of that agent to each square yard of carpet, rug or other article. Then, immediately, said article shall be tightly rolled and placed aside in a clean apartment, where it shall remain for at least ten hours undisturbed, before being returned to the owner. To each article thus disinfected, the label, prescribed in rule fourth, shall be attached, showing that the disinfection required by law, has been done. The local health officer shall exercise a general supervision over these carpet-cleaning establishments also.

RULE SIXTH

For the information of those concerned, the subjoined explanation of the inexpensive apparatus and methods, necessary to be employed to carry into effect these rules, is now given. In mattress factories or second hand stores a tight, pine board box, planed within, should be provided as a disinfecting chamber. It should be sufficiently large to hold a dozen mattresses, etc., at once. They should be separated by slat partitions, onto which the mattresses, etc., should be placed flatwise. In second-hand stores such a disinfecting chamber would hold a variety of upholstered furniture, on top of which mattresses or other articles of bed wear could be spread out.

Then a copper or tin receptacle, cylindrical shape and holding at least one-half gallon, having a screw top, *fitting absolutely air tight*, should be provided. A substantial metal support carries this receptacle or can and holds beneath it an alcohol lamp or other heating device. If an alcohol lamp, it should give a flame sufficiently large to spread over the entire bottom of the receptacle and hold not less than eight ounces. If other means of heating are used they must produce very rapid boiling of fluid in the receptacle. *Slow heat will not produce the required results.*

At or near the top of the apparatus is a metal tube connecting with the interior and fitted with a flexible rubber tube which terminates in a metal or hard rubber nozzle. The apparatus must be so made that it will not clog, or serious explosions may occur.

In one lower corner of the disinfecting chamber a small hole is bored through its wall. When the articles to be disinfected are well adjusted in the

aforesaid chamber, place in the can the disinfecting agents—that is to say, one ounce of powdered borax to each pint of forty per cent solution of formaldehyde (formaldehyde alone cannot be used). Such a can as that described above would hold four pints of formaldehyde and four ounces of powdered borax. The materials being thus placed in the can, fill the alcohol lamp with best alcohol, light and place it under the can. Introduce your metal or hard rubber tube into the hole bored into the box and then leave the apparatus to work for at least forty minutes after it commences to boil. The formaldehyde will have become vaporized and will have filled the chamber. Then remove the tube from the chamber and tightly plug the hole, leaving the box undisturbed for at least twenty-four hours. The purpose had in view will then have been accomplished.

CIRCULAR No. 9

EMERGENCY HOSPITALS

Emergencies are liable to come to any community demanding hospital accommodation and service. The importation of contagious disease by an infected tramp or immigrant is possible and liable at any moment. Floods and conflagrations are also imminent. Every city and town in the state should be prepared for such an emergency, and thereby save what might otherwise cost life and property. Believing that a knowledge of temporary hospitals, cheaply provided, would be of value, the following plans and estimates are suggested, the illustrations for which are given by courtesy of the Provincial Board of Toronto, and the Pennsylvania State Board of Health:

For comfort, security, and thorough ventilation, this tent is the nearest approach to a house in tent form.

Dr. F. H. Brown says of tent hospitals: "The more nearly patients are brought to the condition of being treated in the open air, the more quickly and surely will they recover. The wooden barrack, and the hut, are good, but in many cases the tent is better."

Dr. J. H. Kellogg, of Battle Creek, Mich., writes in Handbook of Hygiene and Medicine: "During the late war a large hospital had in the winter season three hundred and twenty cases of measles. Just at this time it took fire and burned to the ground. The patients were placed in tents, and all but one or two recovered. If the patients had remained in the hospital there is no doubt but thirty to forty, at least, would have died. At one time, one hundred men, but slightly ill, were sent to the general hospital at Nashville, and seventy-five of them died."



FIG. 1—HOSPITAL TENT

SIZE—24x14 Four rooms, 7x7 (two in each end), and one larger room, 14x10, through the centre. The divisions are of sheeting, to slide on cord, and the same height of the tent wall. The tent poles are twelve uprights, one ridge pole ten feet long, and twenty-two wall poles six feet long.

MATERIAL—Ten-ounce white or nine-ounce striped duck of best quality.

COST—Complete, with poles, stakes, guys, etc., about sixty dollars. Flooring, beds and furniture are, of course, extra.



FIG. 2—COOK TENT

Size, 7x7 feet, wall four feet high. **Material**, ten-ounce white duck, best quality. **Cost**, completed, with poles and stakes, not including furniture and utensils, about \$12.00.



Such hospital tents have been in use in Berlin, Vienna, Dresden, Leipsig, and other European cities for many years, with great success.

A more permanent structure is in use in Geneva, Switzerland, and is known as "Pavilion Hospital," an illustration of which is here given from "*La Nature*."

The movable canvas walls give complete ventilation, and, on pleasant days, gives the open air, while they protect at night, and against inclement weather. In winter these walls are double, the ridge construction affording ample ventilation.

To provide for contagious diseases not advisable to admit to the general hospital, what is called a "hut" is recommended, an illustration of which

is here given from Wylie's excellent work on "Construction and Organization of Hospitals."

These huts are planned to have two fresh air ducts from the roof down to within seven feet of the floor, and there provided with scatter boards.

Frame structures are more permanent and durable, and may be used at all seasons. In winter they are warmer than tents. Portable

frame houses can be procured, sufficient in size to accommodate a few patients, and with proper arrangement for ventilation will serve admirably as pavilion hospitals. They can be quickly set up, and if necessary quickly destroyed, and their cost is not great. Illustrations are here given of such a structure:

Every city and town should be provided with one or more such buildings, which can be stored in small space until an emergency necessitates their use. Time is an important factor in suppressing a contagious disease in a community. The sooner isolation of the risk is secured, the more certain are favorable results, and nowhere can proper isolation be more completely secured than in an isolation hospital.

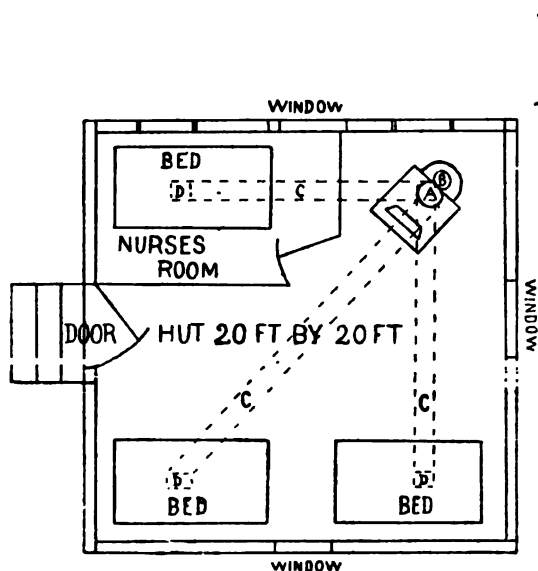


FIG. 4—ISOLATING WOODEN HUT—(Wylie.)

A—Stove. B—Smoke flue. C—Air conductors under floor from under each bed to stove. D—Openings into air ducts.

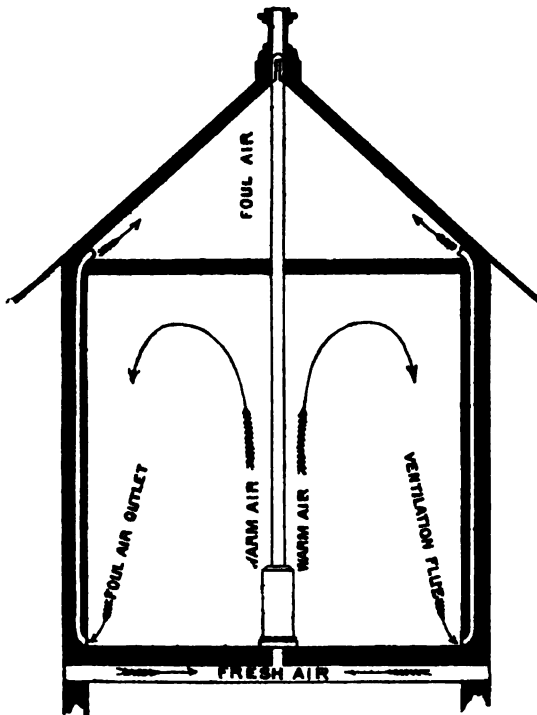


FIG. 7.—PROVISION FOR "RIDGE" VENTILATION —(Hatchison.)

Isolate the first case of a contagious disease, so that others cannot be exposed to it and there will be an end of it—there will be no epidemic. With every additional case the danger of spreading is multiplied rapidly. This is the true purpose of an isolation hospital—to prevent epidemics by segregating the first case in a community.

One of the most important essentials of a hospital is ventilation. The illustration shows an admirable plan to secure this.

Whether pavilions or tents are used, portable or permanent, they should be trenched around to prevent dampness.

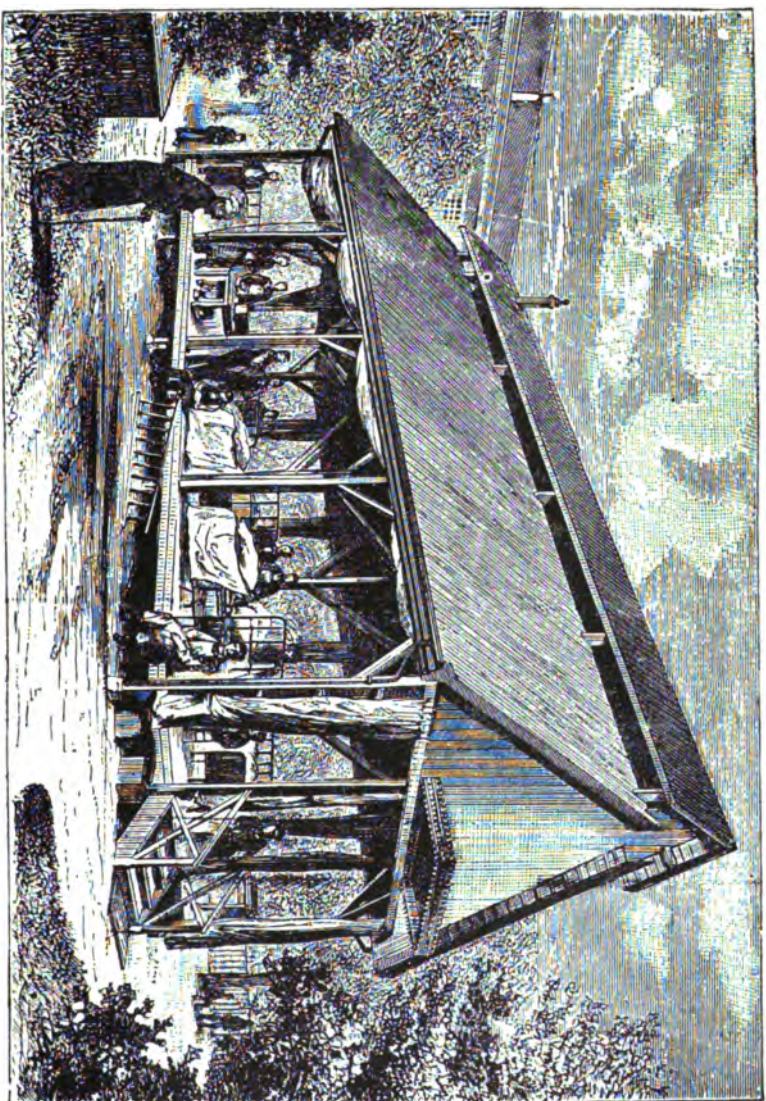


FIG. 3.—PERMANENT PAVILION HOSPITAL

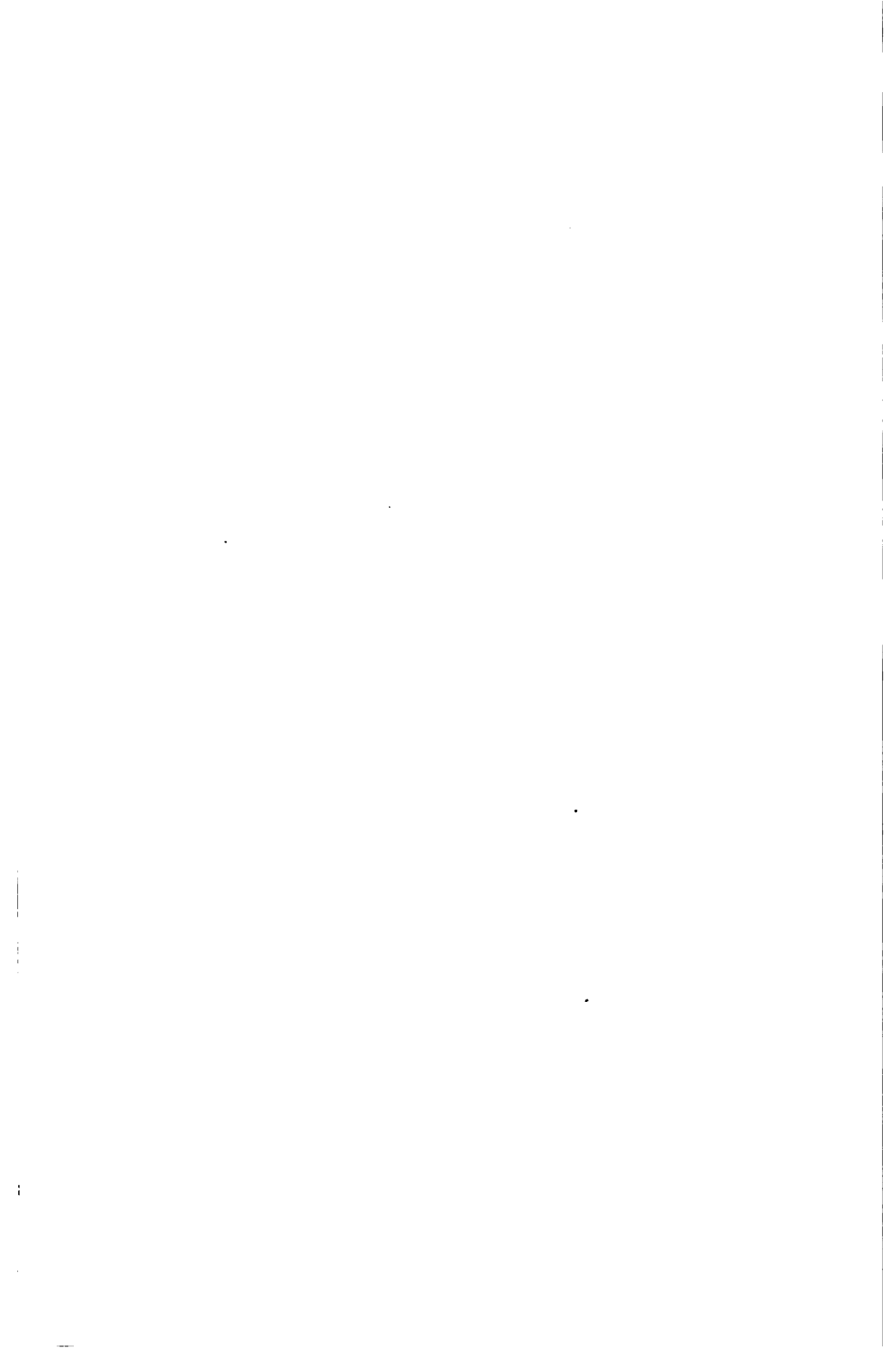




FIG. 5—PORTABLE HOSPITAL PAVILION—EXTERIOR



FIG. 6—PORTABLE HOSPITAL PAVILION—INTERIOR

In locating a hospital the healthiest possible location should be selected. It should be in an open field, on high, dry, porous ground, but protected so far as possible, from chilling winds. In summer a tree-sheltered field or orchard, with grass soil is an excellent location. Pleasant surrounding scenery is also desirable. Avoid valleys and neighborhood of swamps, marshes, open sewers, or offensive factories, and slaughter-houses most rigidly.

Secure also an ample supply of pure water.

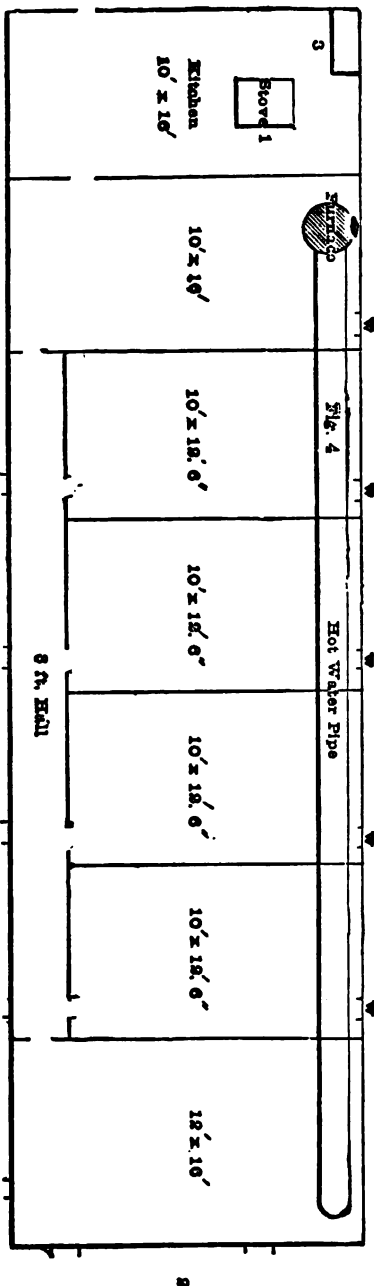
No furniture should be used that will absorb or harbor disease germs. Bedsteads should be of iron and nickel-plated. The mattresses should be of wire. The beds should be of two-thirds the usual size. No upholstered furniture should be used.

When completed do not condemn it and excite public abhorrence by calling it a "pest house." Give it any name but that, which invariably shocks the sensibilities of every human being.

A very commendable and inexpensive permanent frame isolation hospital was planned by St. Thomas' local board, an illustration of which is here given.

The addition of another story over the kitchen and dining room would provide dormitories for nurses. By placing a tank above the furnace, and taps on pipes, hot water could be carried to each room.

FIG. 8. CROSS SECTION OF GROUND FLOOR OF ISOLATION HOSPITAL.
1, cooking stove; 2, Baker furnace—combination of hot water and steam; 3, cupboard; 4, heating pipe, alongside of wall the length of building.



INDEX.

A

	PAGE
Abel, Mary Hinman.....	324
Adams, Dr. C. B.....	31, 41, 42, 47, 49 54, 65, 67
Adulterated food and liquors.....	425, 426
Accidents, railroad.....	82, 417, 421
American Public Health Association.....	17, 18, 47, 86
Anatomical material.....	41, 47, 395
Animal diseases and water supply.....	301
Animals, diseased, laws relating to.....	402, 467, 493
Appropriations.....	79
Auditing committee, reports of.....	17, 25, 31, 39, 47, 52, 62, 67

B

Bacteria in milk, sources of.....	375
Bancroft, Dr. Walton.....	32, 40, 41, 58, 64
Barbed wire.....	415
Baxter, smallpox.....	41
Beans, Peas and other Legumes as Food.....	324
Behm, Dr. Charles W.....	258
Biennial report, tenth.....	20
Bitting, A. W.....	301
Board of Health, law.....	387
meetings, August, 1899.....	11
November, 1899.....	18
February, 1900.....	25
May, 1900.....	31
August, 1900.....	42
November, 1900.....	48
February, 1901.....	54
May, 1901.....	62
members.....	5
Board of Medical Examiners.....	68
certificates issued by.....	69
Bodies for medical purposes.....	41, 395
Bovine tuberculosis.....	19
BRITISH CONGRESS ON TUBERCULOSIS, Dr. A. R. Thomas.....	143
BUBONIC PLAGUE, Surg. Gen. Walter Wyman.....	156
Burials.....	436, 461, 488
Burners, for lamps.....	499
Burrage, Severance.....	308, 372

C

	PAGE
Cadavers.....	41, 395
Calamus, smallpox.....	53
Car sanitation.....	82, 86
Certificates to physicians.....	69
Cheese, skimmed milk.....	326
Chemistry, relation of to sanitation.....	122
Chimneys.....	500
Cigarettes, sale of.....	415
Circulars: Emergency Hospitals (No. 9).....	504
Contagious Diseases in Schools (No. 3).....	451
Disinfection of Woolen, Rag Mattresses (No. 15).....	502
Illuminating and Linseed Oils (No. 6).....	473
Kerosene and Gasoline (Form 90 B).....	497
Local Boards of Health (No. 2).....	443
Ordinance for Cities and Towns (No. 4).....	457
Quarantine and Disinfection (No. 1).....	427
Smallpox (No. 8).....	49, 483
Tuberculosis (No. 5).....	49, 469
Cleanliness.....	438
Coal mines, impure oil in.....	411
Colleges, medical, recognized.....	69
Committees, standing.....	41, 67
Communications.....	26
Complimentary, Remley and Scroggs.....	54
Bancroft.....	64
Concealed weapons.....	421
Conference State and Provincial Boards of Health.....	15, 41
Congress, British on tuberculosis.....	64, 143
pure food and drugs.....	39
Conniff, Dr. R. E.....	15, 19, 26, 28, 41, 53, 54, 58, 67, 76, 127
Corpses, transportation of.....	39, 72, 74

D

Deaths in state institutions.....	114
Dentistry, practice of.....	398
Deputy oil inspectors.....	479
Dickinson, Warren.....	17, 31, 36, 39, 41, 42, 47, 50
Diphtheria.....	49, 57, 431, 454
and milk.....	381
Disease, carriers of.....	120
Diseased animals.....	464
Disinfection.....	437, 438, 471, 489
formaldehyde.....	258, 440
general rules for.....	440
notes on.....	120
woolen mattresses, etc.....	502
DISINFECTION AND INDIVIDUAL PROPHYLAXIS AGAINST INFECTIOUS DISEASES, Dr. Geo. M. Sternberg.....	268

	PAGE
Disinterment permits.....	17, 22, 28, 40, 45, 52, 55, 58, 63
Domestic animals, contagious diseases.....	493

E

EGGS AND THEIR USES, C. F. Langworthy.....	349
digestibility of	358
uses of.....	351
value of as a food.....	355
Election of officers.....	41, 63
EMBALMERS DEPARTMENT.....	72
examinations	53
permits	74
Emergency hospitals	504
Examiners, State Board of Medical.....	68

F

Farm, sanitation for....	133
Fees, Board State Medical Examiners.....	81
Financial.....	16, 23, 28, 37, 45, 50
FORMALDEHYDE DISINFECTION, Dr. C. W. Behm.....	258
Francis, Charles, civil engineer.....	115

G

Gasoline, branding.....	59
in tenements	411
its dangers.....	500
lamps.....	35, 36, 42, 49, 50, 59
regulations respecting.....	497
George, smallpox.....	53
Gibson, Dr. J. I.....	18, 28, 36, 41, 42, 62, 64, 67
Grimes, Dr. Eli.....	36, 41, 64, 67, 118
GROWTH OF PREVENTIVE MEDICINE, Dr. R. E. Conniff..	127
Guilbert, Dr. E. A.....	19, 26, 31

H

Harriman, Dr. W. E.....	101
Health districts.....	390
officers.....	445
Herrick, Dr. J. F.....	19
Hill, Dr. G. H.....	48, 105, 107
Hohenschuh, Prof. W. P.....	39
Hospitals, emergency.....	504
Hyde, Prof. James Nevins.....	238
HYGIENIC TREATMENT OF TUBERCULOSIS, Dr. J. F. Kennedy.....	138

I

Illuminating oils, inspection of.....	473
Independence Hospital, typhoid fever.....	48, 49, 107

	PAGE
Infected milk and the public health.....	378
Infectious diseases..... 11, 19, 27, 34, 48, 56,	80
persons on public conveyances	425
Inspection of petroleum	408, 411
Intoxicating liquors, sale of.....	419
Iowa State College, typhoid fever.....	48, 49, 101
Iowa State Sanitary Association	28

J

Johnson, Dr. L. M.....	25
------------------------	----

K

Kennedy, Dr. J. F.....	17, 18, 41, 63, 76, 96, 101, 133
Kerosene, rules for inspection.....	473
using.....	498
Kime, Dr. J, W.....	19

L

Lamps, gasoline.....	35, 36, 42, 49, 54, 59
kerosene.....	498
La Porte City, smallpox.....	58
Langworthy, C. F.....	349
Le Claire, smallpox	13
LEGISLATIVE SUGGESTIONS.....	79
appropriations.....	79
board medical examiners, fees.....	71, 79
reporting infectious diseases.....	80
vital statistics.....	79
Leprosy.....	434
Light systems.....	43, 64
Linn, Dr. A. M.....	62, 67
Linseed oil.....	15, 20
adulteration of.....	413, 481
Local boards of health, regulations	443
duties of respecting tuberculosis	472

M

Macy, Prof. S. R.....	16, 31, 36, 41, 42, 64, 67, 122
Matthey, Dr. H....	13, 17, 20, 21, 25, 27, 31, 35, 36, 39, 41, 47, 49, 50, 55
McKlveen, Dr. J. A.....	17, 18, 26, 28, 32, 41, 42, 58, 65, 67
Measles.....	57, 432, 453
Medical Examiners, State Board of.....	68
certificates issued by.....	69
colleges recognized.....	69
Medicine, practice of.....	391
Members, State Board of Health.....	5
Memorial, Dr. E. A. Guilbert.....	31, 33

	PAGE
Milk and diphtheria.....	381
scarlet fever.....	382
typhoid fever.....	94, 99, 103, 104, 380
tuberculosis.....	382
impure and adulterated.....	422
infant mortality from when infected.....	378
bacteria in.....	375
supplies and dairying.....	373
Miners' oil, sale and use.....	479
MODES OF INSPECTION AND NOTES ON DISINFECTION, Dr. Eli Grimes.....	118
Modified smallpox, Prof. James Nevins Hyde.....	238
Morehead, smallpox.....	53
Mullan, Charles M., Attorney General.....	64
MUNICIPAL SANITARY ENGINEERING, Charles Francis.....	115

N

National Board of Health.....	19
Nuisances.....	421, 446, 466

O

Office rooms.....	41
Officers elected.....	41, 43
Opium smoking.....	414
Ordinance for cities and towns.....	457
Osteopathy, practice of.....	394
Ottumwa, smallpox.....	19

P

PEAS, BEANS, AND OTHER LEGUMES AS FOOD, Mary Hinman Abel...	324
Penalty, violating rules.....	449
Permits, embalmers.....	74
Petroleum products.....	408, 411
Pharmacy, practice of.....	405
Physicians, certificates issued.....	69
to be notified.....	59
Plague, bubonic.....	156
Poison, sale of and poisoning.....	420
Prevention of typhoid fever.....	94
Preventive medicine, growth of.....	127
Prize fighting.....	420
Prosecutions.....	450
Public schools, infectious diseases in.....	451
Puerperal fever.....	434
Pure Food and Drug Congress.....	39

Q

Quarantine, expenses for.....	444, 449
rules relating to.....	428, 487, 494

R

	PAGE
Rabies.....	15
RABIES, CAUSE, FREQUENCY, AND TREATMENT, Dr. D. E. Salmon....	198
RAILROAD ACCIDENTS AND CAR SANITATION.....	82
RELATION OF CHEMISTRY TO PRESENT DAY SANITATION, Prof. S. R. Macy.....	122
RELATION OF WATER SUPPLY TO ANIMAL DISEASES, A. W. Bitting....	301
Remley, Milton.....	41, 42
Rotheln.....	453

S

Salmon, Dr. D. E.....	198
SANITARY ASPECTS OF MILK SUPPLIES AND DAIRYING, Severance Bur-	
rage.....	373
Sanitary laws.....	396
adulterating food or liquor	425, 426
assaults.....	420
barbed wire.....	415
bodies for medical purposes	395
boxing or sparring contests.....	414
burning dwelling.....	421
canned food.....	423
cigarettes, sale of.....	415
concealed weapons	421
dentistry, practice of	398
diseased animals.....	402
dwellings	420
dynamiting.....	421
exposing child.....	421
female employes, seats for.....	425
firearms, sale of to minors.....	414
gasoline, etc., in tenements.....	411
gunpowder, manufacture of.....	424
health districts	390
state board of	387
impure oil in coal mines	411
infected persons on public conveyances	425
intoxicating liquors, sale of	419
lard, fraud in; compound.....	423
linseed oil, adulteration of.....	413
maiming.....	420
manslaughter.....	420
medicine, practice of	391
milk, impure and adulterated.....	422
miners' oil.....	479
miners, safety of	415
miscarriage.....	421
murder.....	419
nuisances.....	421

	PAGE
Sanitary oleomargarine.....	326
opium smoking.....	414
osteopathy.....	394
pharmacy, practice of.....	405
petroleum products, inspection of.....	408, 411
poisoning.....	420
poison, sale of.....	420
prize fighting.....	420
racing.....	420
railway accidents, to prevent.....	417
railway obstructions.....	421
shooting at trains.....	421
smallpox, spreading of.....	425
soaked goods.....	423
steam boilers.....	422
threshing machines.....	422
tobacco, sale of to minors.....	414
uncoupling cars.....	421
veterinary medicine, surgery and dentistry.....	396
veterinary surgeon.....	401
violating sepulcher.....	422
SANITATION FOR THE FARM, Dr. J. F. Kennedy.....	133
Scarlet fever.....	49, 57, 431, 453
and milk.....	382
Schools.....	448
prevention of infectious diseases.....	451
SCHOOL GARDENING, C. B. Smith.....	317
Schoonover, Margaret S.....	41, 64
Scroggs, Dr. J. A.....	17, 41, 42, 47, 55
Secretary's office.....	41
SEWAGE DISPOSAL IN CITIES AND TOWNS—Severance Burrage.....	308
Shrader, Dr. J. C.....	18, 19, 20, 22, 32, 35, 39, 41, 47, 53, 54, 63, 65
Skimmed milk cheese.....	326
Slaughter houses.....	463
Smallpox.....	12, 19, 47, 48, 54, 228, 238, 425, 431, 453, 483
Baxter.....	41
Calamus.....	53
George.....	53
Laporte City.....	58
Le Claire.....	13
Morehead.....	53
Ottumwa.....	19
Storm Lake.....	25
Washington.....	19
Weston.....	58
SMALLPOX IN IOWA.....	228
Smallpox modified.....	238
precautions in.....	488, 489, 490
Smith, C. B.....	318

	PAGE
Standing committees.....	41, 67
STATE BOARD MEDICAL EXAMINERS.....	68
State institutions, deaths in.....	114
Sternberg, Dr. Geo. M., Surg. Genl., U. S. A.....	268
Stewart, Dr. C. W.....	19
Storm Lake, smallpox	25
Sulphur fumes.....	439
Systems, gasoline light.....	43, 64

T

The dead, in infectious diseases.....	435
Thomas, Dr. A. R., Passed Ass't Surg., U. S. A.....	143
Tobacco, sale of to minors.....	414
Transportation of corpses.....	39
Tuberculosis.....	28, 43, 434
bovine.....	19
British Congress, on.....	64, 143
care of patients.....	471
duty of local boards	472
hygienic treatment of.....	138
milk, caused by.....	382
recommendations respecting.....	469
TYPHOID FEVER.....	92, 432, 454
and milk.....	94, 99, 103, 104, 380, 432
and polluted water.....	105, 433
Hospital for Insane, Independence.....	48
Iowa State College, Ames.....	48, 96

U

Uncoupling cars.....	421
----------------------	-----

V

Vaccination.....	486
in schools.....	452
and the law.....	455
Vaccine virus.....	21
not supplied by the board.....	22
Veterinary medicine, surgery and dentistry.....	396
surgeon.....	401
Violating sepulcher.....	422
VITAL STATISTICS	79, 109

W

Washington, smallpox.....	19
Weston, smallpox.....	58
Whooping cough.....	432, 454
Wicks, for lamps	500

	PAGE
Woodbridge, Prof. S. H.....	86
Wyman, Dr. Walter, Surg. Genl., U. S. M. H. S.....	156

Y

Yaws.....	235
Yellow fever, transit permit.....	58



